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EMERGING RISK

Impacts of Key Environmental Trends in Emerging Asia

Acknowledgements

This report would not have been possible without the financial support of the International Finance Corporation (IFC) and grant funding from the Government of Japan. IFC supports World Resources Institute's (WRI) research on financial materiality of environmental risks in corporate valuation. Emerging Risk is the first in a series of publications under this research collaboration. Special thanks to our WRI colleagues, Andrew Aulisi, Piet Klop, Janet Ranganathan, Polly Ghazi, Manish Bapna, Charles Iceland, Amy Cassara, and Ray Cheung who generously contributed their time and expertise to reviewing many drafts and versions of this report and improving the analysis. We would also like to acknowledge Neelam Singh, Ella Delio, and Fred Stolle for their input on specific sections and thank Florence Landsberg and Susan Minnemeyer for the GIS deforestation maps, and ISciences LLC for the water scarcity map. We are also grateful for the thoughtful contributions by Melissa Brown (formerly of ASrIA), Kavita Prakash-Mani (formerly of SustainAbility), David Goldstein (Cometech AeroAstro Inc.), Neeraj Prasad (World Bank), and the IFC's Sustainable Investing team, especially Brunno Maradei, who all provided valuable guidance on the scope and direction of this research. Also thank you to Jennie Hommel for managing the review process, Margaret Yamashita for her excellent copy-editing, and Barbieri & Green for their creative efforts in designing the report.

April 2009

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Forward

The current global financial crisis has highlighted the need to manage risk and has given new impetus to an old debate in the investment community on how to value environmental risks. While evidence increasingly shows that issues such as climate change and water scarcity pose material risks for companies, progress on pricing these externalities has been somewhat slower, particularly in emerging markets.

In Europe, Japan and the United States, many corporations now measure and manage their emissions of greenhouse gases. There has also been a sharp rise both in environmental corporate reporting and in climate-related shareholder resolutions, reflecting demands from investors who want to know how companies are managing the risks and opportunities associated with a warming world. New and growing interest in the investment community on the issues of water scarcity, deforestation, and natural resource depletion, suggests that climate change may have opened a door through which a multitude of environmental issues are changing the way the investors value companies.

The relevance of environmental sustainability to investment must not be limited to London, New York, and Tokyo. Emerging markets have grown at an unprecedented rate in the past 20 years, driven by investments made by both local investors and large institutional investors in OECD countries, however insufficient information on how companies in emerging markets manage environmental risks and opportunities hinders investors' ability to make sound long-term investment decisions. Understanding which environmental and social risks are material will help investors seek appropriate information from companies, assess corporate value, and direct capital to sustainable enterprise. Re-directing capital injected into South and Southeast Asia's growing economies toward less environmentally destructive economic activity will not only reduce investment risk, it will also help support the region's long term prosperity.

Emerging Risk is the first report in a series establishing the link between issues like climate change, air pollution, water supply, and natural resource depletion and traditional financial analysis on corporate value and financial strength for companies in six key Asian economies – India, Indonesia, Malaysia, Philippines, Thailand, and Vietnam. The report lays the groundwork for analysts to understand environmental issues as financially material, and for companies to see the financial benefits of reducing their environmental impacts.

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Development Director
International Finance Corporation

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Executive Summary

The health of the planet is becoming a significant issue for the financial and corporate world. Powerful global trends around the environment, sustainability, business, and investment have converged to a point that certain environmental issues have become material financial matters for publicly traded companies and their investors. Financial markets that are attuned to these trends are likely to create strong incentives for companies to improve their environmental performance.

The relevance of environmental sustainability to investment is not limited to London, New York, and Tokyo. Emerging markets have grown at an unprecedented rate in the last two decades as large institutional investors have increasingly looked to these markets as investment destinations.

Emerging Risk is an introduction to a series of sector reports on the financial materiality of key environmental trends in India, Indonesia, Malaysia, Philippines, Thailand, and Vietnam.* It forms part of a research collaboration between the World Resources Institute (WRI) and the International Finance Corporation (IFC) to give investors in emerging Asian countries the information and tools they need to link the materiality of issues such as climate change, air pollution, water scarcity, and deforestation to traditional financial analysis.

Emerging Risk sets the scene with an overview of the principal players, main stock exchanges, selective environmental trends affecting emerging Asian nations, and the impacts of the trends on critical sectors in the six focus countries. This report is intended for international and local investors as well as analysts, policymakers, and researchers who cover this region. It should be useful to any investor-related audience seeking to understand the business impact of environmental trends on publicly listed companies in emerging South and Southeast Asian countries.

Because this report addresses an investment-oriented audience with varying degrees of knowledge about environmental issues, we have framed the issues in terms of broad environmental themes or trends, reflecting those typically identified in reports by the World Bank, Asian Development Bank, and the like.

At a Glance: Environmental Trends and Risk Categories for Investors

Trends

- Deforestation
- Water Scarcity
- Climate Change
- Food Security
- Energy Security
- Air Pollution
- Urbanization
- Population Growth

Risks

- Operational or physical
- Regulatory and legal
- Reputational
- Market and product
- Financing

The six Asian economies on which we focus—India, Indonesia, Malaysia, Philippines, Thailand, and Vietnam—all have rapidly growing industrial, commercial, and financial sectors, and all are susceptible to environmental risk. For example, all six are particularly vulnerable to the physical risks associated with climate change. The region's rapid economic growth has fueled the world's highest increases in the commercial and domestic demand for energy. In 2008, the six countries together contain approximately 1.6 billion people, or about 25 percent of the world population.

The above box summarizes the main environmental trends we explore and the main types of risk they engender. Physical impacts are likely to be the most pronounced and can directly affect a company's daily operations, for example disruption in production due to a lack of water or severe weather-related damage to company assets.

Our research shows that resource-dependent sectors—like forestry products, food and beverage, and oil and gas—which are important

Exposing the Information Gap

The limited (or even lack of) public environmental and social information currently being provided by many local companies in the six countries does not meet investors' quantitative and risk-oriented information needs. Relative to best practices in developed countries, corporate disclosure standards are lagging in emerging Asia (see the WRI study *Undisclosed Risk: Corporate Environmental and Social Reporting in Emerging Asia*).

This dearth of information has a double downside. First, investors must make decisions with an incomplete knowledge of companies' exposure to environmental and social risks and opportunities, and second, Asian businesses are hurt over the long run by their failure to address potential financial, operational, and reputational risks. Better reporting alone will not enable financial markets to respond to environmentally sustainable companies. Even in developed markets, more disclosure does not immediately translate into value. What is needed is a fundamental alignment between economic incentives and environmental stewardship.

** The sectors identified thus far, albeit subject to change, are food and beverage, power generation, and real estate.*

to these emerging Asian economies, are precisely those that will be affected by the physical impacts of environmental trends. The construction and real estate sectors also have become significant economic players and are highly dependent on the availability and cost of raw materials. The manufacturing sectors range from low value–added goods, such as textiles, to high value–added goods, such as software, and they often are highly resource (labor, energy, and water) intensive. India, Malaysia, and the Philippines have a thriving service sector, such as business process outsourcing, which is highly dependent on a skilled workforce.

To illustrate the environmental challenges facing companies operating in this region, we use three case studies: supply chain pressures on Staples, the office supplies giant; the effects of water scarcity in India on Coca-Cola's manufacturing process; and the physical effects of flooding in Indonesia on sectors ranging from automobiles to telecommunications.

In the years ahead, investors and asset owners, particularly large institutional investors, will have a role to play in redirecting capital toward more environmentally sustainable economic activities, which can reduce investment risk and support the region's long-term prosperity. This report is intended to help them take the first steps in that direction.

In Context: Trends, Players, and Barriers

The sustainability practices of European and North American corporations, and the financial institutions that analyze and invest in them, are changing, with asset managers, financial analysts, and other actors increasingly viewing environmental, social, and corporate governance (ESG) issues as financially material. Although the financial sector has not yet fully incorporated these issues into its financial models, it does recognize that ESG issues may be material to investors' long-term investment returns. Large institutional investors – the asset owners - increasingly accept that incorporating long-term issues like climate change into their investment decision-making process is part of their fiduciary duty.[1]

Even though investors in Europe and the United States are aware of, and to a lesser extent analyze, ESG trends, this is generally not the case in emerging market countries, despite the evident and significant environmental and social impacts of rapid economic development.[2] The Asia Pacific region has had the world's fastest-growing gross domestic product (GDP) since the 1990s. This remarkable economic progress has had clear environmental and social consequences.

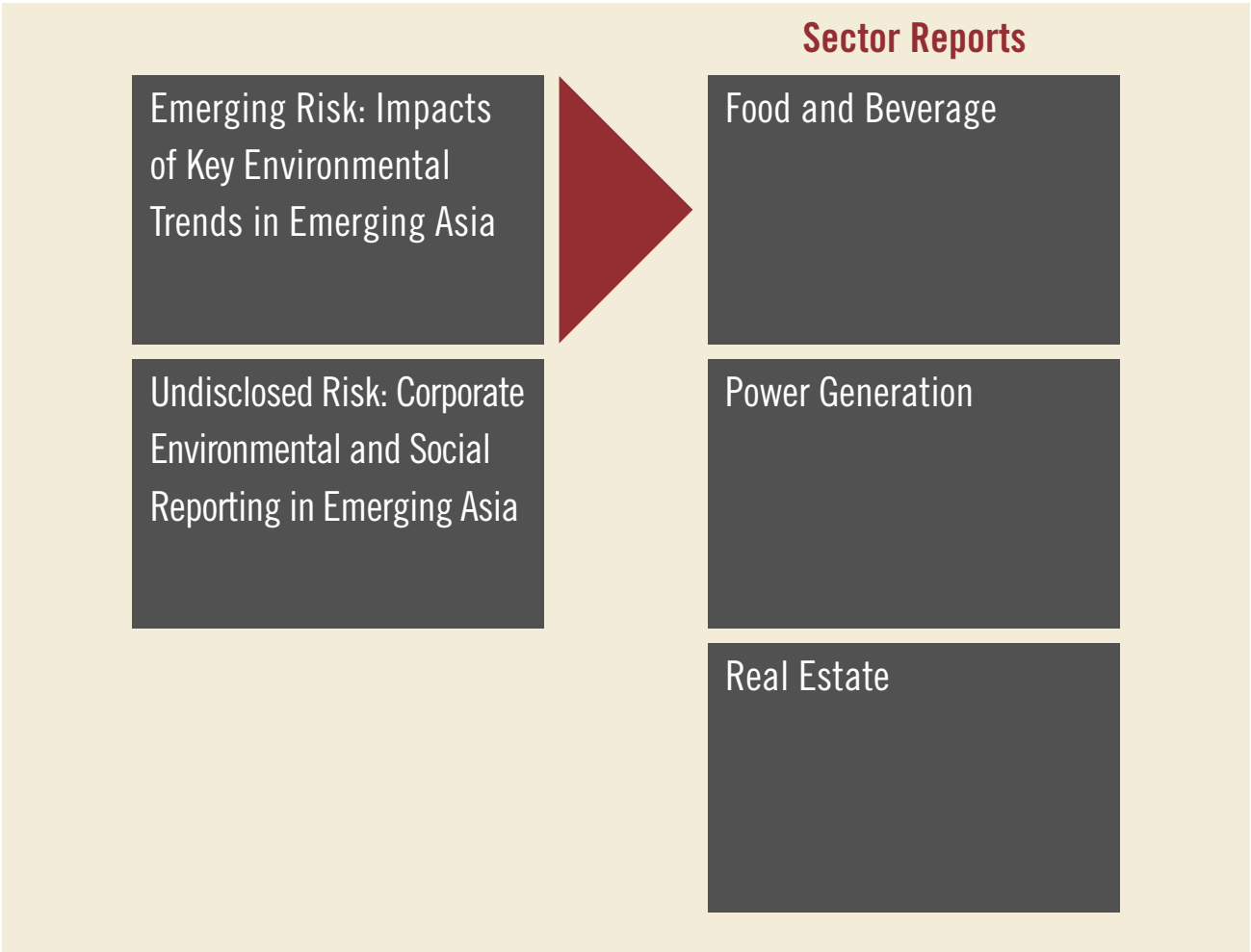
More recently, local and foreign investors in Asia's emerging markets are becoming aware of high-profile environmental trends and their potential impact on investment returns. Accordingly, a number of new, socially responsible investment (SRI) funds and indexes that use ESG-based strategies have been launched in the region.[3] Although these products have not yet had a significant effect on the financial markets, they have provided momentum for investors to move Asian companies toward more sustainable practices through their investment decisions.

Focusing on the six Asian economies of India, Indonesia, Malaysia, Philippines, Thailand and Vietnam, this introductory report seeks to:

- Raise investor awareness around environmental trends for each country, and the region as a whole.
- Determine how key business sectors could be affected by the risks and opportunities arising from these trends.
- Briefly evaluate corporations' current environmental and social reporting and disclosure practices.

Emerging Risk will be followed by sector reports connecting these trends more closely to the investment decision-making process. Each sector report will demonstrate how environmental trends affect value drivers in that sector and help investors and analysts assess the trends' financial impacts on company valuations. The aim of this body of research is to increase capital formation in environmentally sustainable listed companies in emerging Asia (figure 1).

Figure 1: Project Overview



Source: World Resources Institute

Featured Trends

Deforestation — The region's forests are disappearing at an alarming rate.

Water Scarcity — The high demand for water, coupled with water pollution, means that water reserves are being used faster than they can be replenished.

Climate Change — Rapidly increasing global emissions of greenhouse gases (GHGs) are leading to floods, droughts, and extreme weather events, as well as to international pressure to reduce emissions and shift to low-carbon technologies.

Food Security — The recent steep rise in rice and wheat prices is threatening to undo advancements made in poverty reduction and workforce health.

Energy Security — This region's economic growth has led to the world's highest increases in the demand for energy, along with rising global energy prices.

Air Pollution — As the countries in this region have become more industrialized and motorized, the air quality of their cities has deteriorated.

Urbanization — The percentage of the population living in cities in emerging Asian countries has risen dramatically.

Population Growth — This region contains a quarter of the world's population as of 2008, leading to significant stress on local resources.

Trends

Emerging Risk explores the likely risk implications of eight environmental trends for companies in India, Indonesia, Malaysia, Philippines, Thailand and Vietnam. We selected these trends based on environmental themes and trends identified by the World Bank, the Asian Development Bank, and other regional experts.* Our goal is not to undertake a comprehensive study of all the environmental trends in Asia, as there already is a vast body of literature on this, but instead to focus on the business impacts of select trends on critical sectors.

At both the regional and country level, we highlight pressing environmental issues facing each economy. In the future sector reports, we will identify more precisely and in more detail the most significant effects of these trends.

We then discuss the impacts of each trend on critical sectors in each country. The sectors were chosen by WRI for their significant contribution to the market value of the domestic stock exchanges, with the exception of agriculture, which was selected because of its contribution to GDP.

Finally, we briefly review the corporate environmental and social disclosure practices in the six focus countries. This section draws from the WRI Study "*Undisclosed Risk: Corporate Environmental and Social Reporting in Emerging Asia*," which examines both the characteristics of and the drivers for corporate reporting in the six countries' ten largest (by market capitalization) companies.

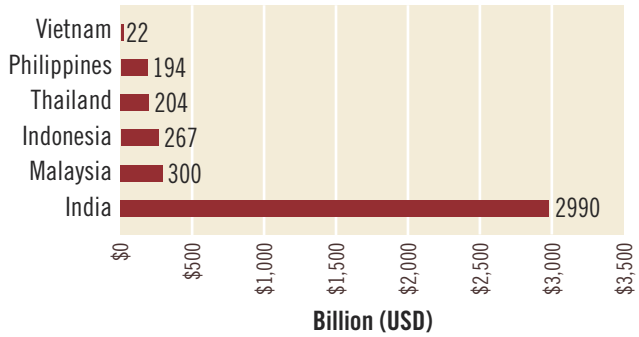
Players

Relative to developed markets, the stock markets in the six focus countries are small and nascent. Vietnam opened the doors of its first-ever stock exchange only in 2000. Clearly, there is a significant difference between Vietnam and India but overall, in these countries, market capitalization is concentrated in a few companies, trading volumes are thin, and prices are driven more by speculation and rumor than by market fundamentals or company value.

Stock Exchanges

The sizes of the six countries' stock exchanges differ significantly, with India having the largest market capitalization and the highest number of listed companies, as shown in figures 2 and 3.

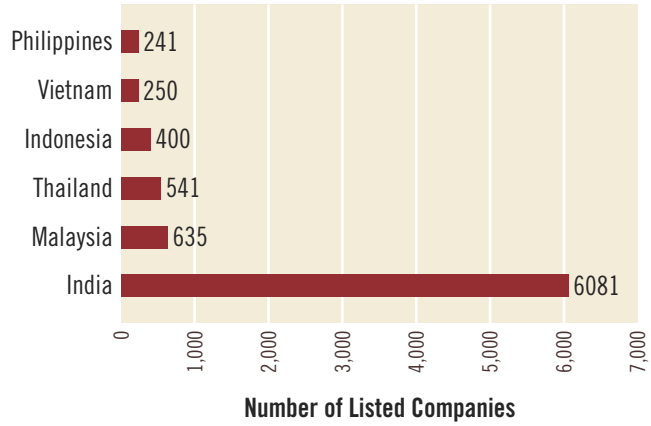
Figure 2: Market capitalization (exchange rate adjusted to US$) of national stock exchanges as of December 31, 2007



Note: For countries that had more than one stock exchange, the values were added together.
Source: Data from national stock exchanges.

** The literature reviewed includes World Bank country reports on the environment in Asia and the Pacific, Asian Development Bank country environmental analysis reports, and the United Nations Economic and Social Commission for Asia and the Pacific (ESCAP) report "State of the Environment in Asia and the Pacific".*

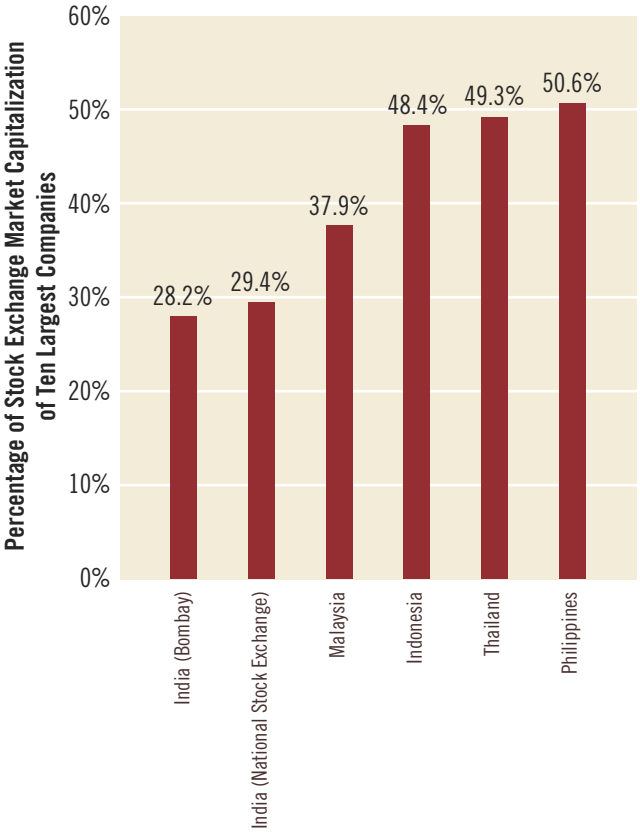
Figure 3: Number of listed companies on national stock exchanges as of December 31, 2007



Note: For those countries that had more than one stock exchange, the values were added together.
Source: Data from national stock exchanges.

A large percentage of the six stock exchanges' total value is concentrated in the ten largest (by market capitalization) companies (figure 4). The high concentration of value in relatively few companies is a sign of an underdeveloped market vulnerable to speculative investment patterns and high volatility.

Figure 4: Concentration of stock exchanges' value, 2007

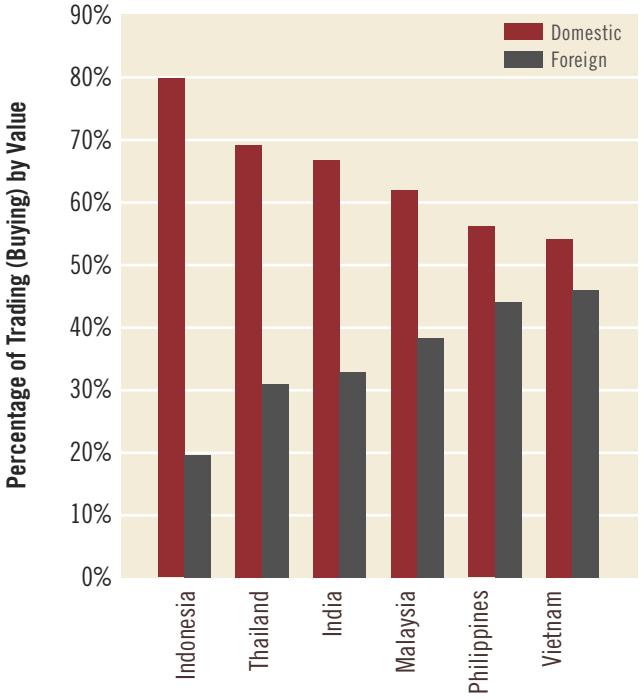


Source: World Federation of Stock Exchanges

Investors

In the last ten to fifteen years, the six countries' stock markets have become more open to foreign investors, and their more liberalized laws also have attracted more foreigners to their capital markets. For example, in India, investments by foreign institutional investors reached more than US$51 billion in March 2007, up from US$3 billion in 1995.[4] Figure 5 shows the significant level of foreign participation in the six countries.

Figure 5: Total percentage trading value of foreign investors' purchases, May 2008



Sources: National Stock Exchanges [5]

Foreign investors typically invest in emerging markets with a long-term (five years or more) time horizon.[6] Therefore, they are more likely to be interested in the impact on valuation of environmental and social trends, which also play out on long-time horizons. For this reason, foreign investors have a strong role to play in demanding better environmental and social standards and more disclosure from the emerging market companies in which they invest. In turn, they also can influence the actions of local investors.[7]

Although investors in emerging markets may not be getting the requisite company information officially, some evidence suggests that they are nonetheless learning about firms' environmental and social performance by engaging directly with them.[8] That is, a company may not wish to reveal publicly the risks it faces, especially if it does not have a mitigation strategy, but local analysts and insiders may still have private, informal access to critical information.

According to Asian SRI experts ASrIA, local analysts in the region "are aware of environmental and social issues, though not on a deep

level."[9] Indeed, the Enhanced Analytics Initiative, which encourages including extra-financial issues in investment research, has seen relatively little such research from Asia during its four years of surveying investment research globally.[10] To investors and analysts in emerging markets, economic growth and development clearly still take precedence over environmental issues.

Barriers

Including environmental and social issues in financial valuation—not just an analysis of the trends but full integration into a financial model—is a challenge even in more mature capital markets like those of Europe, Japan, and the United States.

A recent study of European buy- and sell-side analysts found that few included extra-financial information in their valuations.[11] A number of technical and institutional barriers, discussed next, prevent companies and equity investors from potentially profiting from understanding the relationship between environmental and financial performance.

Technical Barriers

Financial valuation is a tool for making better investment decisions. A firm's future cash flow is the best measurement of its current value. One of the reasons it is such a robust metric is that it requires complete information. A key problem with environmental risks is that companies do not fully inform the market about them, often because they themselves do not fully understand them. Consequently, investors have limited information to price these risks in their discounted cash flow (DCF) models. According to a recent survey of asset managers based mostly in Europe, this lack of public transparency is the main obstacle to incorporating ESG principles into their investment decisions on emerging market equities (figure 6).[12]

Discounting the Future

A related challenge is that the DCF technique places a premium on the immediate and a discount on the future. No matter how large a cash flow is, if it is scheduled to occur far into the future, it will have virtually no impact on a company's present value. Physical climate risk, for example, may be seen as ten to twenty years away and therefore deeply discounted in a typical DCF valuation. Because environmental issues have a longer time frame than many investors' investment horizon, they may well ignore these longer-term environmental issues. Some risks also are shaped by policy uncertainty and the possibility of looming regulation, which again play out on longer time horizons.

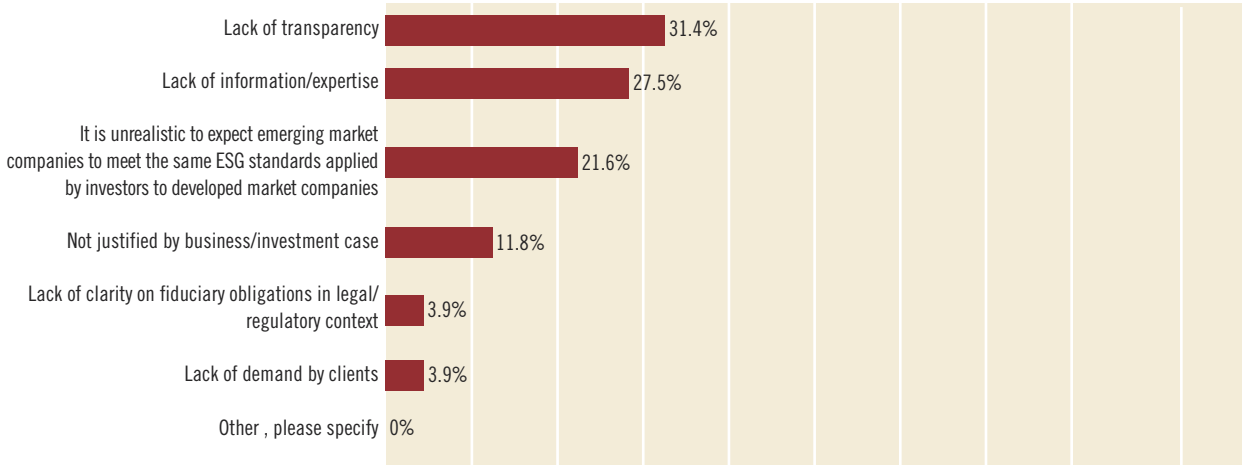
Other metrics, such as return on invested capital (ROIC) or earnings per share (EPS), have an even shorter term, requiring information about only the next few years, and therefore they are even less suitable for determining environmental value.

Institutional Barriers

Many equity investors are not familiar with environmental discourse.[13] Phrases such as "environmental performance," "sustainability value," and "ESG" lack precise definitions. Environmental practitioners and investment analysts do not use common frameworks or techniques. Indeed entirely different regulatory regimes guide each of their bodies of work. Meanwhile, financial incentives are misaligned as companies and analysts are rewarded for short-term profits, even at the expense of long-term sustainability.

Figure 6: Survey of Asset Managers, 2008

Asset managers: What is the main obstacle to incorporating ESG principles in the investment process for emerging market equities? (74 respondents)



Source: International Finance Corporation, UN Global Impact and Swiss Department of Foreign Affairs.

The Way Ahead: Best Practices

Despite these barriers, the translation of environmental factors into financial value is making progress, especially in Europe. Innovative research providers now include long-term trends, material extra-financial issues (EFIs), and intangibles in their calculations of fair value. As evidence of this, the Enhanced Analytics Initiative, which has been evaluating the effectiveness of such research since 2004, recently reported "notable advances in the integration of EFIs into financial analysis and their coverage of complex emerging themes."[14]

Extra-financial information can be incorporated into a DCF model in two principal ways.[15] First, an environmental issue can affect the timing, quality, and magnitude of a company's cash flows. For example, if a price on carbon increases costs, the effect of that increase can be quantified and incorporated into the DCF model. Second, an analyst can make a qualitative judgment to adjust a company's risk premium to account for the increased (or decreased) risk caused by the environmental issue.

Relative valuation methods, where a company is valued based on how it compares to others in the industry on a metric such as its price-earnings ratio, could also be adjusted to account for environmental factors. If all the companies in one sector are affected by the same issue, their different responses and strategic positions can result in a competitive advantage for one firm over another, which will be reflected in their relative valuation.

A final method is the use of real options.[16] Option analysis can be used when future cash flows are uncertain because they are contingent on the occurrence of specific events.[17] Environmental issues present companies with associated risks and opportunities as well as strategic choices for addressing them. These choices—which can either create or destroy a company's value if certain events (such as regulation or the physical impacts of climate change) occur—may be valued using options.

II

Environmental Trends in Emerging Asia and their Impact on Key Sectors

In this section, we discuss eight environmental trends affecting emerging Asian economies, the key industrial sectors impacted by each trend, and the type of risk (or opportunity) that is created.

We present the trends as aggregate regional trends; country specific trends and impacts follow in section III. Some environmental trends are interrelated, and others, like population growth, exacerbate the impact of other trends.

Environmental risks may be understood at two levels of impact: sector level and company level. Sector-specific risks encompass physical, regulatory/legal, and market risks.

- Physical risks arise from a sector's dependence on the physical environment, making some sectors more vulnerable than others.
- Regulatory/legal risks are those that change the operating environment because of government intervention, such as the introduction of a carbon tax.
- Market risks are caused by a change in consumer or investor preferences.

Even though a risk may apply to an entire sector, individual companies will have different levels of exposure to that risk, based on factors like corporate strategy or geographic location. Company-specific risks include operational, litigation, reputation and financing risks.[18] An operational risk occurs when an environmental trend disrupts operations, for example, physical damage to assets arising from extreme weather related to climate change. Litigation risks refer to the threat of litigation arising from a company's actions, such as chemical spills that endanger human health. Damage to a company's reputation can result from negative environmental news, and may translate into a fall in the company's share price. Financing risks arise when financiers attach a premium to the cost of capital due to the perceived higher risk associated with, for example, a company's poor environmental management.

Within a particular sector, a company's exposure to risk is a function of factors such as its management strategy, value chain, and geographic location. Therefore, some companies in a sector will be able to respond better to emerging risks than others and thus gain a competitive advantage. In addition, some trends themselves may present market opportunities for developing new products and technologies.

The risks and opportunities may be short term (immediate to five years) or long term (more than five years). Short-term impacts typically refer to pricing and costs, while longer-term impacts generally revolve around market demand, changes in consumer preferences, and regulation (table 1). The aggregate trends and their sector specific impacts follow.

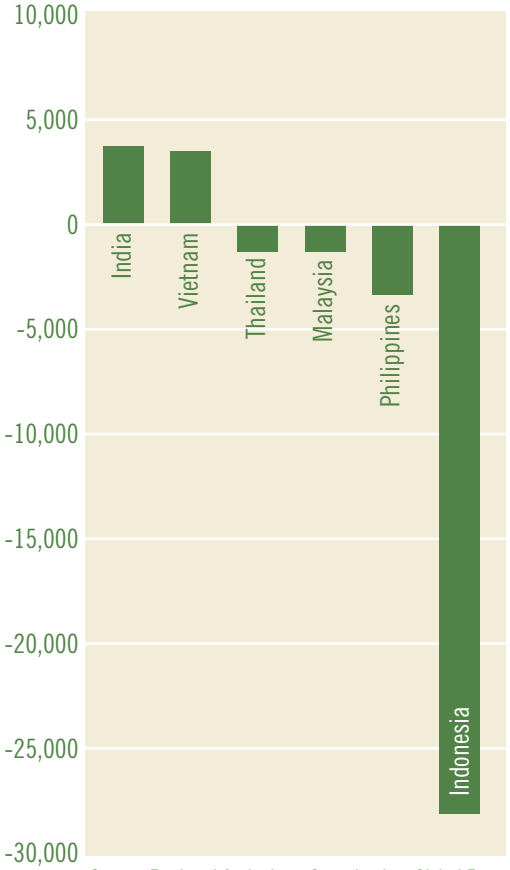
Table 1: Examples of Short- and Long-Term Impacts of Environmental Trends

Trends	Short-Term Impacts	Long-Term Impacts
Deforestation	• Shortage and increased prices of raw material • Fines • Changes in consumer preferences	• New markets and revenue opportunities
Water scarcity	• Increased scarcity or cost • Greater competition among users	• Shortages • Regulation
Climate change	• Damage to assets • Disruption of operations	• Regulation • New markets and revenue streams
Food security	• Higher prices of raw materials • Reduced productivity or output	• Shortages
Energy security	• Higher input costs • Disruption of business operations	• Changes in consumer preferences
Air pollution	• Lower productivity • Damage to assets	• Changes in consumer preferences • Regulation
Urbanization	• Increased market demand • Decreased productivity	• New markets and revenue opportunities • Magnifies impacts of other trends
Population growth	• Larger market size • Lower cost of labor	• New markets and revenue opportunities • Magnifies impacts of other trends

Deforestation

- Deforestation is a change of land use from forest cover to another use, often agriculture.[19]
- Although Southeast Asia still contains 16 percent of the world's remaining tropical forests, between 1995 and 2005 the region accounted for 25 percent of global forest loss (figures 7 and 8).[20] Indonesia's forests suffered the greatest loss.
- Deforestation accounted for approximately 17 percent of global GHG emissions in 2004.[21] The continued loss of forests is a global concern, given its impact on climate change. Accordingly, the next iteration of the international climate change agreement after 2012 will likely address deforestation and forest degradation, and also provide incentives to developing countries to manage their forests more sustainably.
- Although the causes of deforestation vary and largely depend on the local area, land conversion (for agriculture and plantations) and logging (both legal and illegal) are the principal culprits in all six focus countries.[22]
- The local effects of deforestation include soil erosion, drought, reduced flood protection, impaired water quality, less food security, and loss of livelihood (table 2). These effects can lead to large human migrations out of deforested areas into cities and towns, putting additional stress on urban infrastructure capacity.

Figure 7: Net change in forested area (1000s hectares) (1990-2005)



Source: Food and Agriculture Organization, Global Forest Resources Assessment, 2005

Figure 8: Original and lost forests, 2006

Legend

- Intact Forest Landscapes
- Current Forest Cover
- Estimated Original Forests

Source: World Resources Institute / Global Forest Watch and Greenpeace, "Intact Forest Landscapes," 2006.

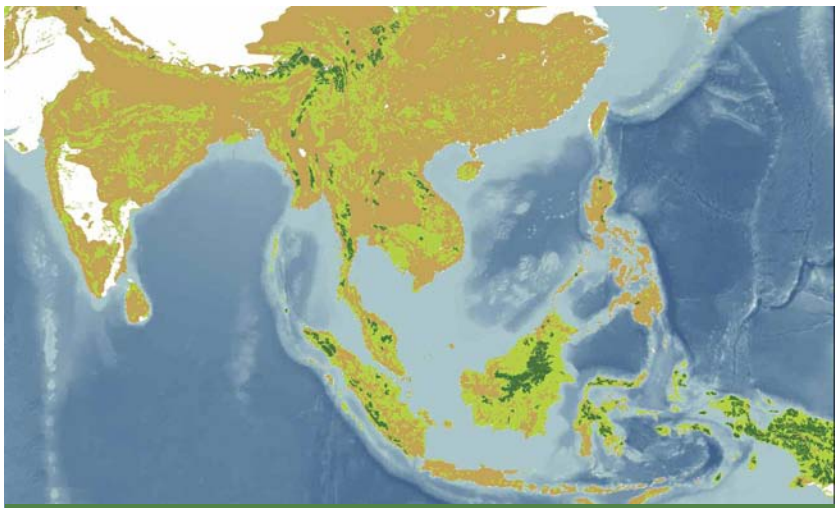


Table 2: Illustrative Sector Impacts of Deforestation

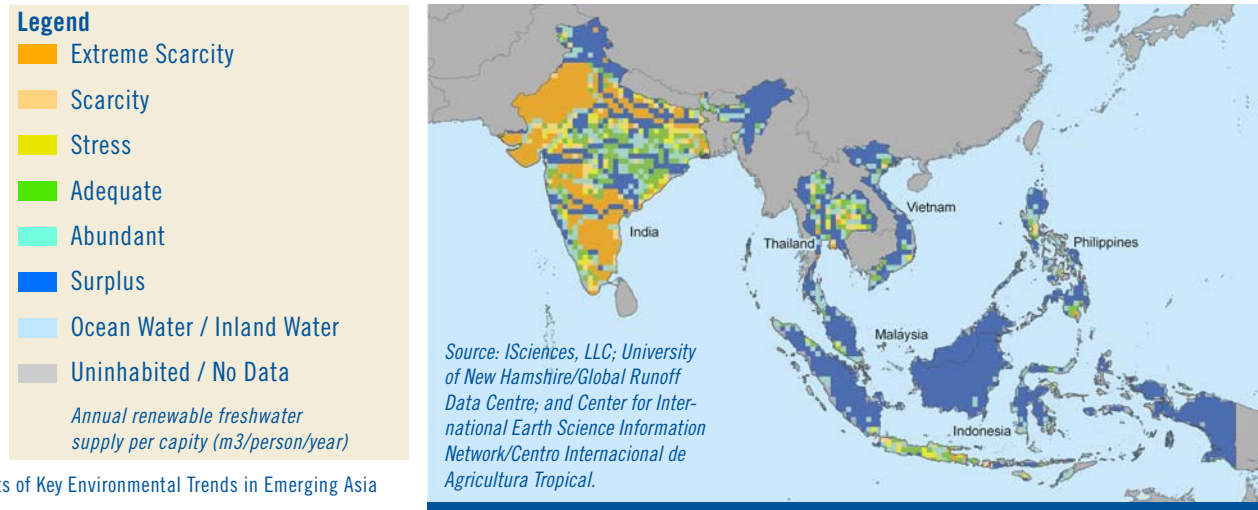
Sector	Type of Risk or Opportunity	Risk or Opportunity	Notes
Forest products, construction	Operational	Increased scarcity or cost of inputs, lower quality of inputs	Pulp and paper mills require operation at full capacity to recover investment costs, typically more than US$500K. This may lead to a local or regional shortage of raw material for paper and pulp and possibly conflict with the need for long-term concessions from the timber industry.
	Regulatory/legal	Extraction moratoria, lower quotas, fines, denial or suspension of permits	Forests are increasingly valued for a wider range of ecosystem services (e.g., climate regulation and water filtration) than for only their timber.[a] The next international climate change agreement will likely contain incentives for countries to limit deforestation. New regulations in end markets such as the European Union and United States (the Lacey Act) will seek to limit imports of illegally harvested timber.
	Market	Changes in consumer preferences, supply chain pressure	Retail customers may be concerned about the reputation risk associated with procuring products that may have come from illegal or unsustainably managed forests (see box: Staples and APP). Several certification schemes (e.g., Forest Stewardship Council) differentiate among sustainable wood products in the marketplace.
Agriculture, food and beverage	Operational	Reduced output or productivity	Restrictions on forest conversion may raise the cost of land. Climate change may disrupt weather patterns and also increase the risk of erosion, drought, and floods.
Plantation (e.g. palm oil)	Regulatory	Planting moratoria, denial or suspension of permits	The development of palm oil plantations is a major cause of deforestation. Any regulation that seeks to protect natural forests may limit the availability of land, thus forcing the sector either to use the land more efficiently or to restore degraded land with no forest cover.

[a] On the importance of ecosystem services to corporations, see World Resources Institute, "Corporate Ecosystem Services Review," 2008; http://www.wri.org/project/ecosystem-services-review.

Water Scarcity

- Water scarcity is increasingly a problem for parts of India, Indonesia, and Thailand (figure 9).
- Even in those areas with naturally abundant water, the actual amount available may be reduced by water pollution and waste mismanagement. Deforestation also worsens water quality because forests help regulate water quality and flow.
- By altering weather patterns, climate change may mean more rainfall or drought in certain areas than in the past, thereby contributing to unpredictable water cycles and availability.[23]
- Population growth and urbanization have resulted in a large number of competing users depleting water reserves faster than they can be replenished. India, in particular, is drawing heavily on its already minimal water resources.
- The vast majority of water withdrawals in the six countries are for agricultural use (from 62 percent in Malaysia to 95 percent in Thailand). In Malaysia and Vietnam, industry also is a significant user at 21 and 24 percent, respectively.[24]

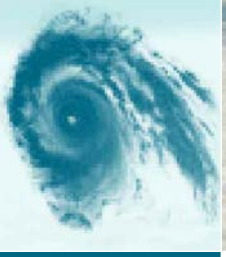
Figure 9: Annual renewable freshwater supply per capita, 2000



Source: ISciences, LLC; University of New Hamshire/Global Runoff Data Centre; and Center for International Earth Science Information Network/Centro Internacional de Agricultura Tropical.

Table 3: Illustrative Sector Impacts of Scarce Water

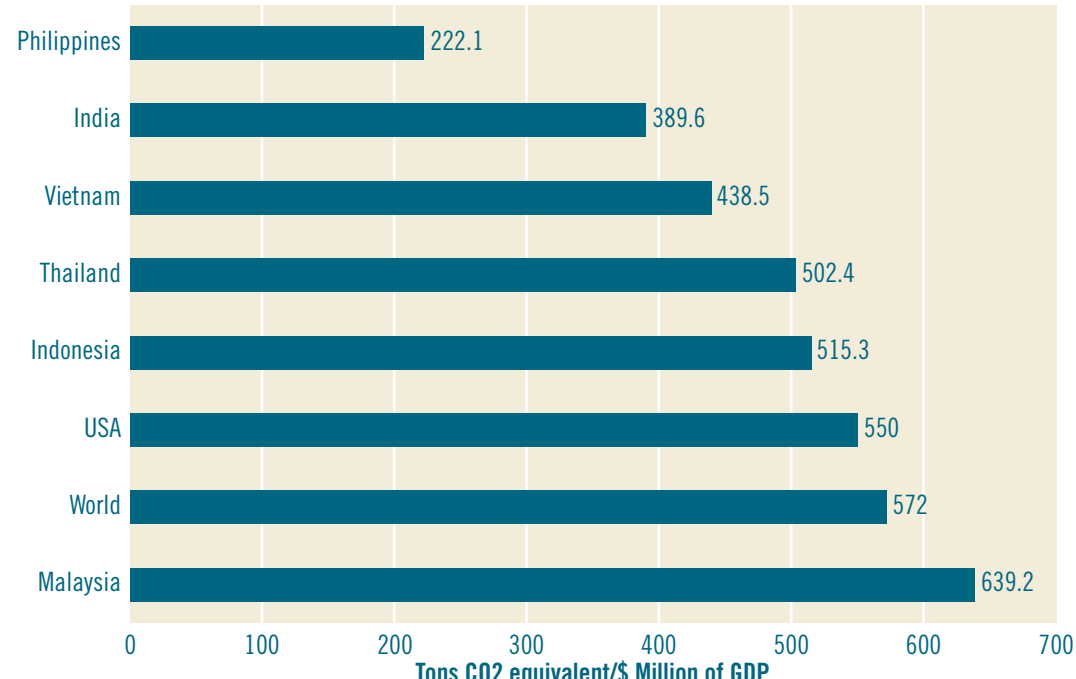
Sector	Type of Risk/ Opportunity	Risk/ Opportunity	Notes
Agriculture, food and beverage, mining, power generation, steel, electronics, and pulp and paper	Operational	Increased scarcity or cost of inputs for both products and processes and in the supply chain	Because all these sectors heavily depend on the use of water in their industrial processes, they may face production disruptions and higher prices.
	Regulatory or legal	Extraction moratoria, lower quotas, user fees, fines, denial or suspension of permits, litigation	Because water is essential to life, governments will likely intervene to restrict usage when water becomes scarce.
	Reputational	Damage to brand or image	Heavy users or polluters of water are especially at risk as competition over water between industrial and life-sustaining uses intensifies.
Agriculture, manufacturing	Operational	Reduced output or productivity	The lack of access to potable water endangers the health of the workforce, critical for labor-intensive industries.



Climate Change

- Due to their long coastlines, low-lying land areas, high population densities, high incidence of poverty, and geographic location, the six focus countries are particularly vulnerable to the physical risks associated with climate change.
- Although not historically responsible for a large share of global GHG emissions (only 8% of cumulative emissions as of 2000), these countries' emissions have been increasing due to mounting energy use, as well as deforestation and changes in land use.[25]
- The intensity of GHG emissions in Malaysia and Indonesia, mostly from deforestation and changes in land use, are close to or above the world average and that of the United States (figure 10).
- The physical effects of climate change are expected to include more frequent and intense droughts, extreme storms, decreased availability of fresh water, rising sea levels, lower crop yields, greater incidence of disease, and loss of species and habitat.[26] These effects are likely to lead to migration and pressure on local resources in already densely populated urban areas.
- All six countries are signatories to the Kyoto protocol, although as non– Annex I parties, they are not bound by specific emissions reduction targets.[27] Because these countries are not responsible for a large share of global emissions but are particularly vulnerable to the effects, their focus is on adaptation, not mitigation.
- India, Philippines, Thailand, and Vietnam are promoting energy efficiency and GHG mitigation programs, even though none of the six countries has or is currently developing national- or subnational-level climate change regulation. India has a national climate change plan, but it does not include binding targets or other regulatory mechanisms.
- Because even companies within the same sector have widely varying business strategies, management systems, and energy profiles, some will be winners and others losers under any GHG regulatory framework.

Figure 10: GHG intensity of focus region compared with that of the U.S. and world average, 2004



Note: GDP is expressed in purchasing power parity terms.
Source: World Resources Institute, Climate Analysis Indicators Tool (CAIT), 2008.

Table 4: Illustrative Sector Impacts of Climate Change

Sector	Type of Risk/ Opportunity	Risk/ Opportunity	Notes
All	Operational	Damage to assets, disruption of business operations, increased scarcity or cost of inputs (water, energy), and lower output or productivity	All companies possess physical assets that could be damaged by the physical effects of climate change (i.e., extreme weather). Climate change also will alter temperature and rainfall patterns, and the effects of these changes can ripple throughout companies' supply chains.
	Regulatory/legal	Carbon tax import restrictions (in developed country markets)	Although domestic limits on GHG emissions are unlikely to be implemented in the near future, companies could face external pressure from customers in developed country markets that have adopted emissions reduction targets.
Power generation, forest products, transportation	Regulatory or legal	Lower quotas, denial or suspension of permits or licenses	Companies in energy-intensive sectors could be subject to future regulation of GHG emissions, which, by imposing a fee for carbon emissions, would lead to a financial cost either directly (through the company's carbon-intensive manufacturing processes) or indirectly (through energy and/or supply chain costs).
Automobile, transportation	Market	Changing consumer preferences	The rising cost of transport fuel could spur demand for more fuel-efficient vehicles.
Forest products, construction and engineering	Market	New markets	Ecosystem services (such as climate regulation), green buildings, energy efficiency, and clean technology, could present new market opportunities.

Food Security

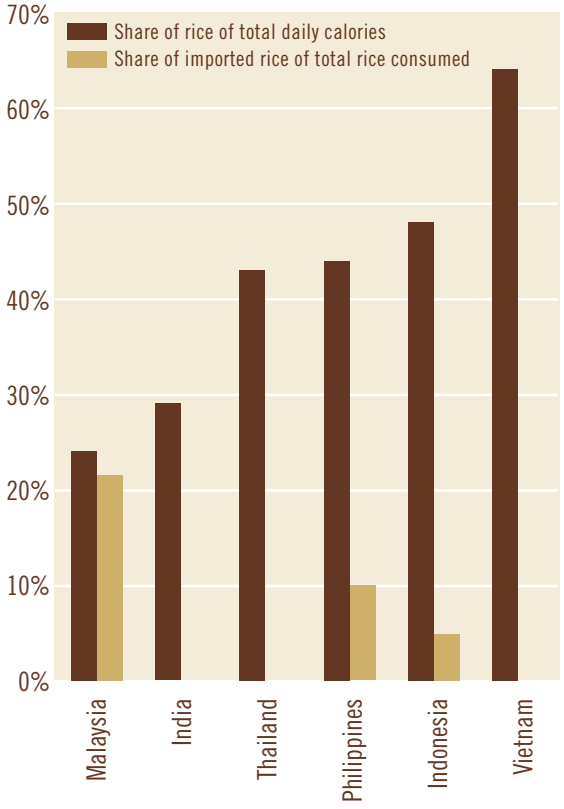
- The recent dramatic rise in the global prices of rice and wheat threatens to undo advances in poverty reduction in Southeast Asia.[28] According to the World Bank, the price of staple foods like rice and wheat has climbed 80 percent in the region since 2005.[29]

- Given that poor people spend between 60 to 80 percent of their income on food, they will be hurt the most by high prices (figure 11).[30]

- The reasons for higher food prices include the rising price of oil (affecting transportation and fertilizer costs), adverse weather, greater demand for meat and dairy products as Asian countries become richer, and increased global demand for biofuels, all of which are exacerbated by ineffective agricultural policies and market controls.[31]

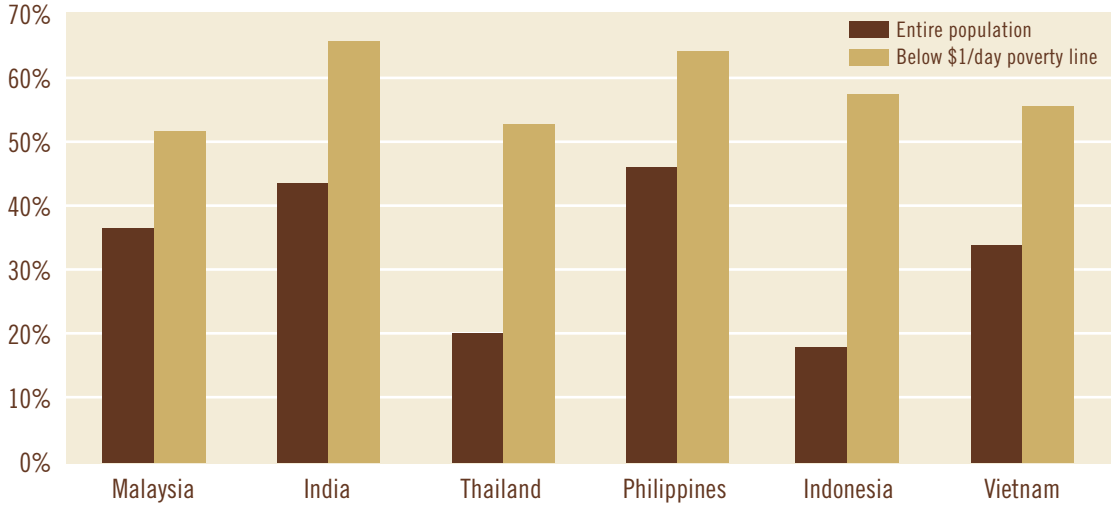
- The factors driving up food prices are expected to intensify as populations continue to grow and climate change alters agricultural yields. Prices are expected to remain high through 2015.[32] The populations of the six focus countries depend heavily on rice for a large proportion of their total daily calories. Some nations, such as Vietnam, Thailand, and India, are largely self-sufficient in rice production, whereas others, such as the Philippines, depend more on imports (figure 12).

Figure 12: Rice consumption and dependence on imports, 2003



Source: International Rice Research Institute (IRRI), "Recent Trends in the Rice Economy", 2003.

Figure 11: Share of income spent on food and beverages, 2005



Source: Asian Development Bank, "Research Study on Poverty-Specific Purchasing Power Parities for Selected Countries in Asia and the Pacific", 2005.

Table 5: Illustrative Sector Impacts of Food Security

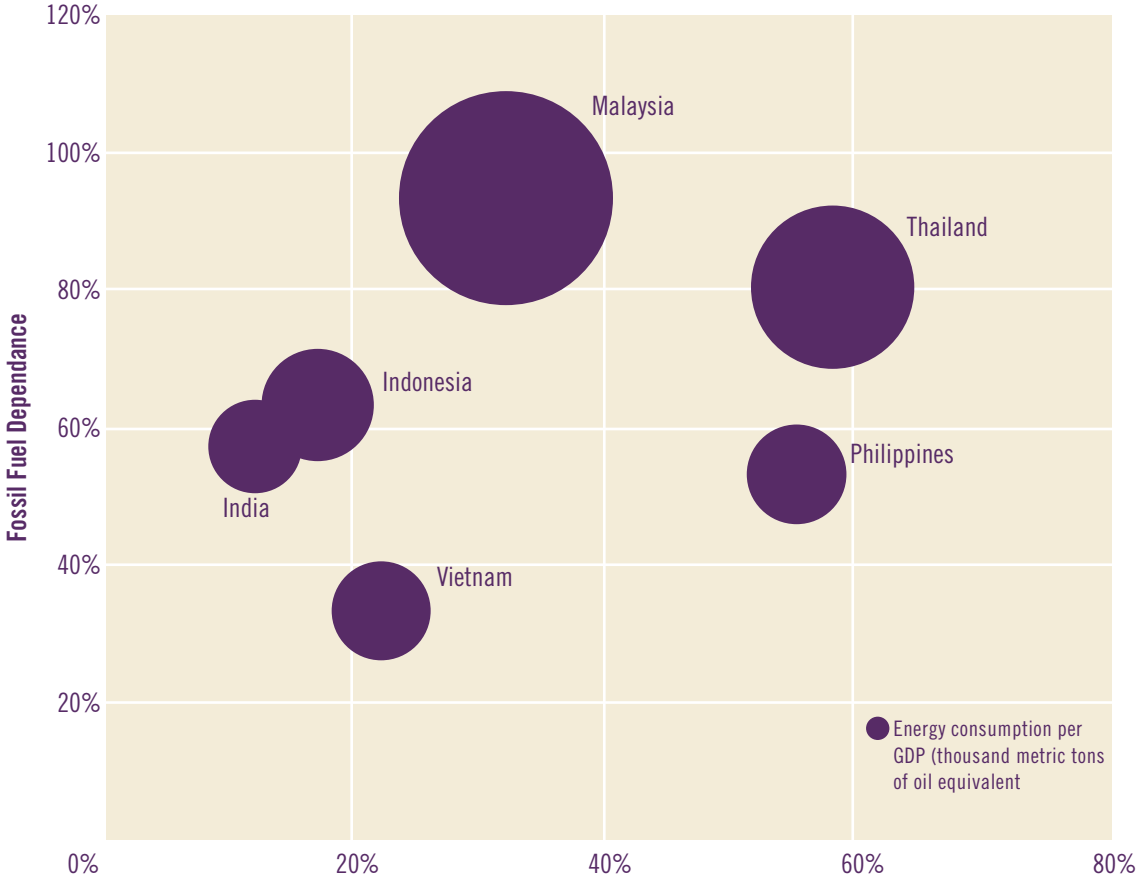
Sector	Type of Risk/ Opportunity	Risk/ Opportunity	Notes
Agriculture, food and beverage	Market	Higher unit price	Small-scale, often poor, farmers will likely lose because they lack the means to respond to price trends (i.e., to expand production) and are especially vulnerable if they are net buyers of food. Medium- to large-scale farmers may benefit from higher prices because they are more likely to be able to increase yields to take advantage of price increases.[a]
Farming equipment, chemicals (fertilizer)	Market	Increased market demand	Sustained higher prices can lead to expanded farming and investment in technology for higher yields.
Consumer goods	Market	Decreased market demand	High food prices means less disposable income to spend on "nonessential" goods.
Agriculture, manufacturing	Operational	Lower output or productivity	A lack of food endangers the health of the workforce, critical for labor-intensive industries.

[a] Asian Development Bank, "Food Prices and Inflation in Developing Asia: Is Poverty Reduction Coming to an End?" April 2008.

Energy Security

- Although energy consumption per capita remains low, the region's rapid economic growth has led to the world's highest demand increases for energy, by both companies and consumers.[33]
- Malaysia's and Thailand's rates of energy consumption per GDP are close to or above the world average (figure 13).
- Because much of the region's energy needs are met by fossil fuels (oil and coal), their economies are vulnerable to rising energy prices (especially those heavily reliant on imports) as well as to pressure from the international community to reduce their GHG emissions.
- All six countries subsidize fuel costs to keep prices low, although Indonesia, Thailand, and Malaysia have recently rolled back their subsidies, resulting in reduced demand.

Figure 13: Energy dependence of each economy, 2003



Source: World Resources Institute, Earth Trends, 2003.

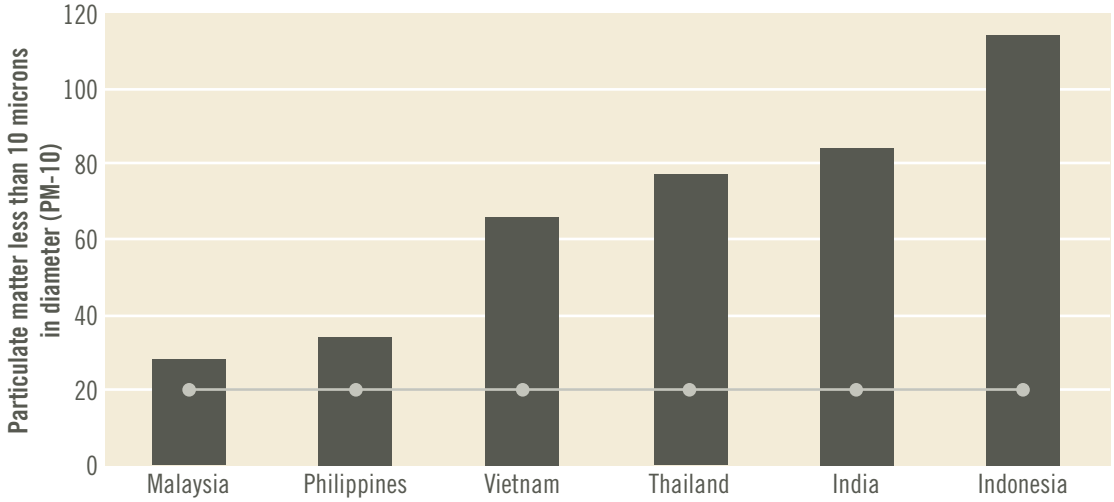
Table 6: Illustrative Sector Impacts of Energy Security

Sector	Type of Risk/ Opportunity	Risk/ Opportunity	Notes
All	Operational	Increased cost of input, disruption of business operations	All companies may face a higher cost of energy, whose impact depends on their energy profile. Companies may also face power shortages and blackouts.
Oil and gas	Operational	Higher unit price	Higher oil prices give companies an economic incentive to undertake more difficult, and potentially more environmentally damaging, exploration projects.
Consumer goods	Market	Reduced market demand	Consumers spend an increasing proportion of their salaries on energy, thus decreasing their demand for other goods. Goods, like plastics, that use oil as a key ingredient will face rising materials costs, but these are likely to be passed on to consumers.
Power generation, automobiles	Product	Changes in consumer preferences (toward cleaner technology and energy sources), higher cost of raw materials	New power plants have become more expensive to build, owing to rising materials costs. Plants using renewable energy sources, such as solar, will pass on these costs to customers in the short term, as the new plants must provide adequate returns for investors.
Construction, engineering, power generation	Market	Increased market demand	A new energy infrastructure may be built.

Air Pollution

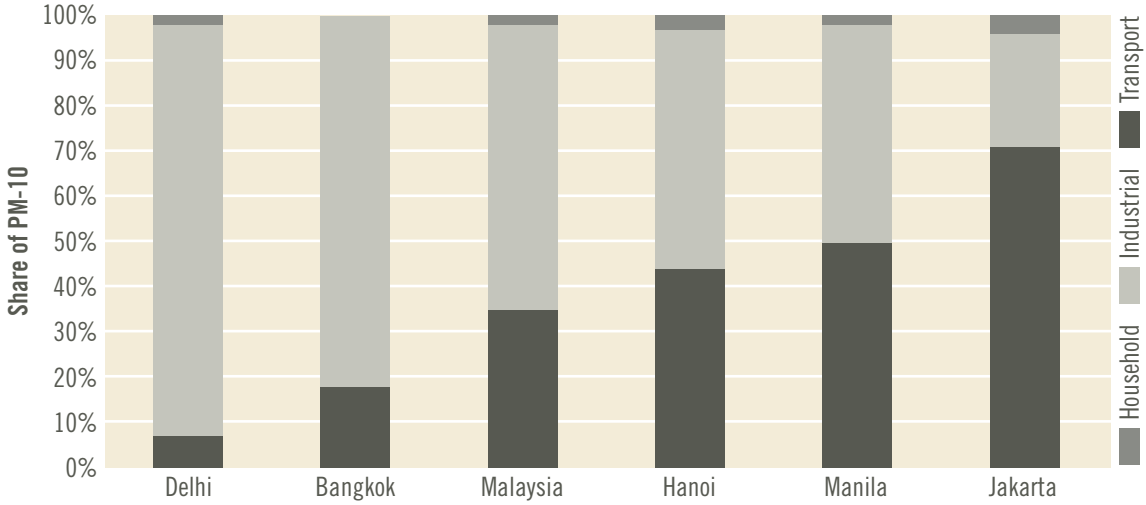
- The average air quality of the six countries is poor (figure 14).
- Poor-quality air damages human health. In 2007 the World Health Organization (WHO) estimated that air pollution in Asia was responsible for the premature death of about half a million people each year, due to the exposure of more than a billion people to outdoor air pollutant levels above WHO's guidelines.[34]
- Industry and transportation are the major causes of air pollution. Transportation sources are largely responsible for CO_2 and NOx, while industrial sources are responsible for particulate matter (PM) (figure 15), which is particularly harmful to human health and is linked to heart attacks and asthma.[35]

Figure 14: Levels of particulate matter (PM-10) compared with WHO guidelines, 2007



Source: World Health Organization (WHO), "Estimated Deaths & DALYs Attributable to Selected Environmental Risk Factors, by WHO Member State, 2002," 2007.

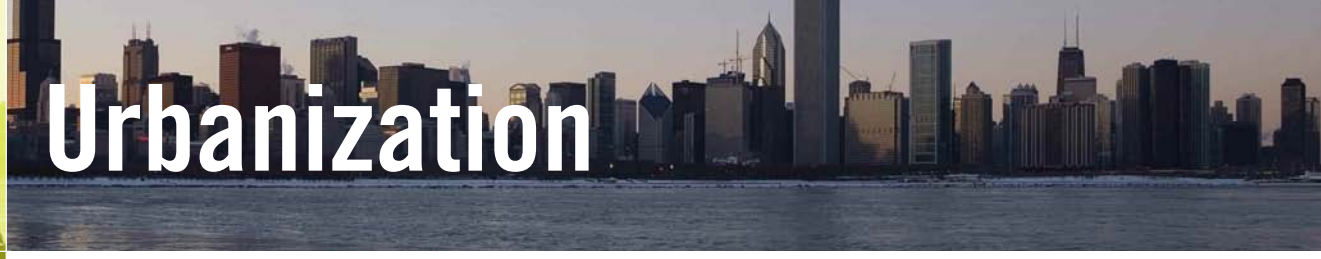
Figure 15: Sources of particulate matter (PM-10) by country and sector, 2006



Note: Country-level data available only for Malaysia.
Sources: Clean Air Asia, "Country Synthesis Reports: India, Indonesia, Malaysia, Philippines" 2006.
World Bank, "Air Quality Studies of Thailand and Vietnam", 2002.

Table 7: Illustrative Sector Impacts of Air Pollution

Sector	Type of Risk/ Opportunity	Risk/ Opportunity	Notes
Agriculture, construction	Operational	Disruption of business operations, lower productivity	Air pollution can damage human health, affecting workers' (especially outdoor workers) productivity or availability.
Real estate	Operational	Damage to assets	Air pollution can damage buildings, reducing their value.
Power generation (especially from coal)	Regulatory	Increased cost (investment in new technology)	Local governments will pressure, and perhaps offer financial support to, high-polluting industries to reduce emissions and invest in cleaner technology.
Transportation	Market	Changing consumer preferences (cleaner technology)	Demand for lower emissions vehicles, such as trains and hybrid vehicles, will rise.
Power generation, cement, oil and gas	Reputational	Damage to brand or image	Air pollution can hurt the health of the general population as well as companies' own workers.
	Litigation	Lawsuits	



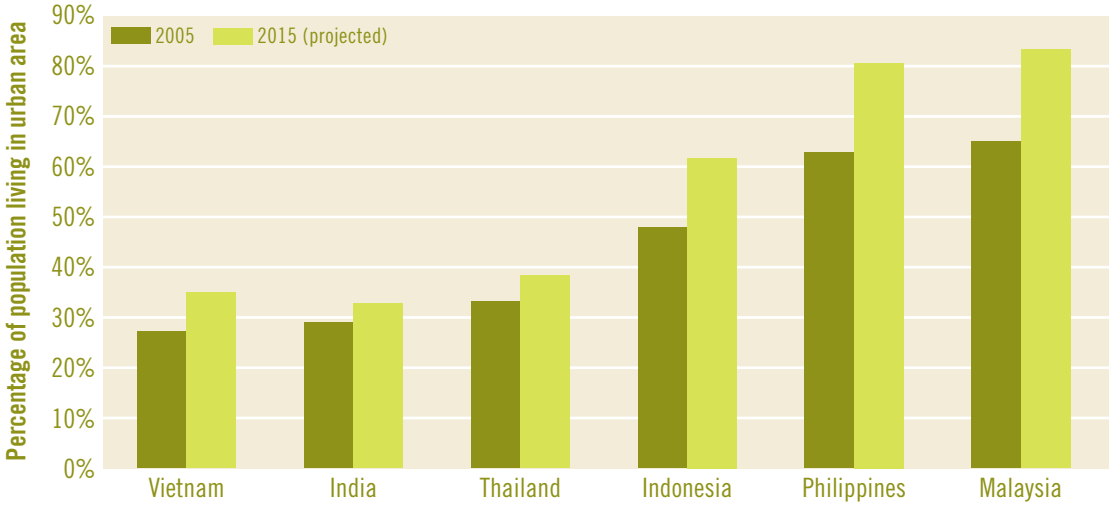
Urbanization

- The populations of India, Thailand, and Vietnam are mainly rural, whereas those of Indonesia, Malaysia, and the Philippines are highly concentrated in urban areas.[36]
- The majority of people in the six countries live in cities or towns with a population of less than 500,000, as opposed to so-called mega cities, with a population of 10 million or more (figure 16).
- Urbanization is expected to continue, with some of the migration coming from rural areas and some due to natural increases in the population (figure 17).
- The rise in the urban population does not have to be bad for the environment. If managed correctly, it can have less impact than low-density rural lifestyles do. If the growing urban population is not managed well however, local resources and infrastructure may not be able to support it.[37]

Figure 16: Percentage of urban population living in cities, by size, 2005

Source: United Nations Population Division, World Urbanization Prospects: The 2007 Revision Population Database.

Figure 17: Percentage of people living in urban areas in the six countries in 2005 and 2015



Source: Asian Development Bank, "Urbanization and Sustainability in Asia," 2006.

Table 8: Illustrative Sector Impacts of Urbanization

Sector	Type of Risk/ Opportunity	Risk/ Opportunity	Notes
Construction, engineering	Market	Increased market demand	The expansion of cities requires the construction of infrastructure, including housing, roads, and pipes.
Power generation	Operational	Lower cost of transmission and distribution	
Transportation	Market	Changing consumer preferences	Demand for public transportation rises as cities grow and traffic increases.
All sectors (located in larger urban areas)	Operational	Lower productivity	In larger cities, air pollution and traffic hurt workers' productivity.

Population Growth

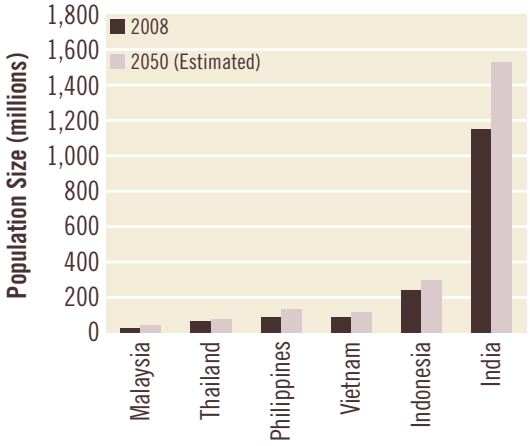
- The growing affluence and consumption of the six countries' burgeoning populations, especially those of India and Indonesia, may exacerbate the negative impacts of the other trends and will increase competition for resources among people and industries (figure 18).

- The combined population of the six countries covered in this report is approximately 1.6 billion, or about 25 percent of the world population in 2008.[38] A significant proportion can be considered poor (figure 19).

- The average age in several of the countries, notably Vietnam, is low, resulting in a low population dependency ratio.* Although it currently has the lowest dependency ratio, the Philippines will have the highest by 2050 (figure 20), and consequently, may have difficulty supporting its nonworking population as its proportion of workers shrinks over time.

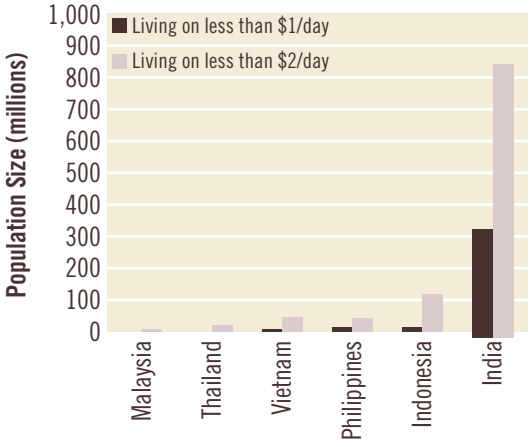
- The burden of providing resources for a large and increasingly affluent population can exacerbate deforestation, water scarcity, air pollution, climate change, and the problems of food and energy security.

Figure 18: Population Size, 2008



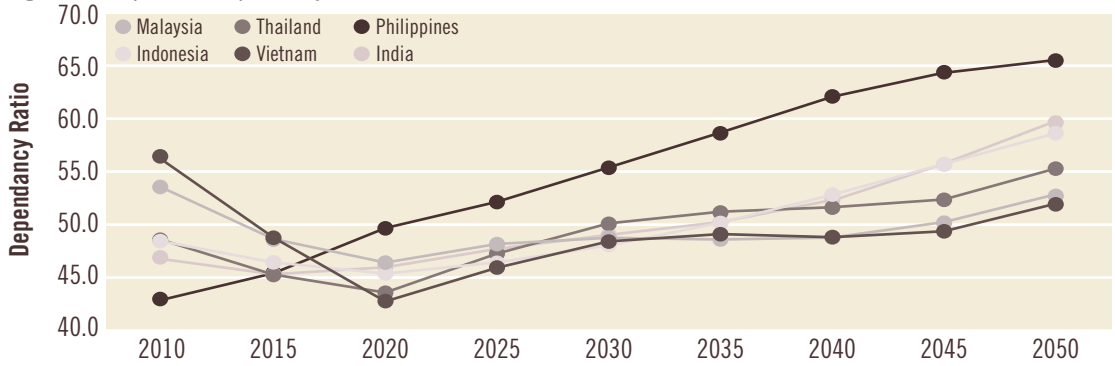
Source: United Nations Department of Economic and Social Affairs/Population Division.
International Monetary Fund, 2008.

Figure 19: Incidence of extreme poverty in absolute terms, 2005



Source: Asian Development Bank, "Key Indicators 2005: Labor Markets in Asia: Promoting Full, Productive, and Decent Employment," 2005.

Figure 20: Population dependency ratio, 2006



Source: United Nations Population Division, Department of Economic and Social Affairs, "World Population Prospects: The 2006 Revision: Total Dependency Ratio" 2006.

** The population dependency ratio is the ratio of dependents (people younger than fifteen or older than sixty-four) to the working-age population (those aged fifteen to sixty-four). A rising dependency ratio is a concern in many countries with an aging population, since it becomes difficult for pension and social security systems to provide for a significantly older, nonworking population.*

Table 9: Illustrative Sector Impacts of Population Growth

Sector	Type of Risk/ Opportunity	Risk/ Opportunity	Notes
Food and beverage, consumer goods, construction, automobiles	Market	Increased market size	
Textiles, manufacturing	Operational	Lower cost of labor	A surplus of labor keeps wages low in low value–added sectors.

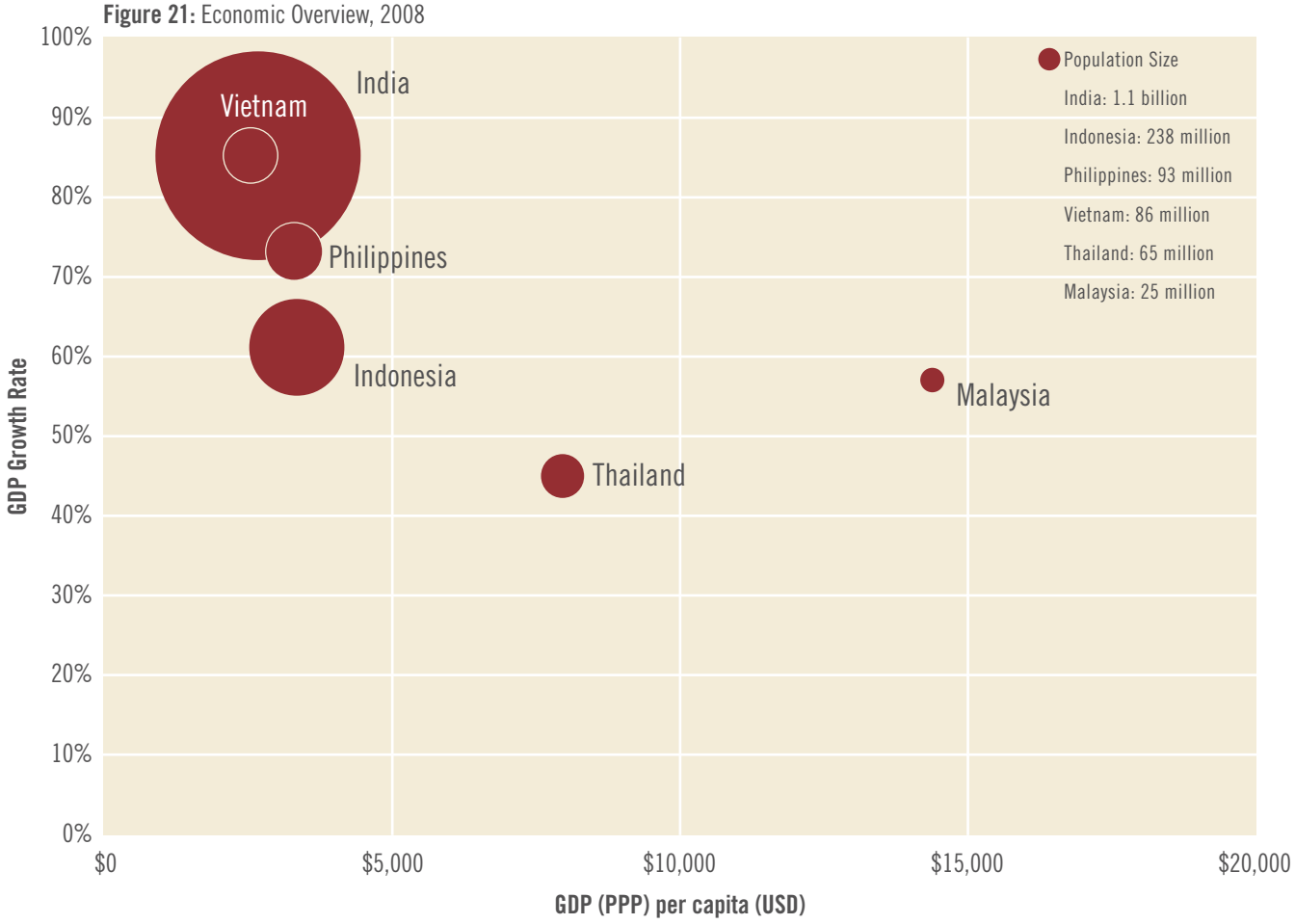
III

Emerging Asian Countries: a Deeper Look

In this section, we examine the trends from a country specific context. We explore what we assess to be each country's most relevant environmental trends and their impact on key economic sectors. The impact of a trend such as deforestation depends on a country's geography, natural resources, population, and policy responses.

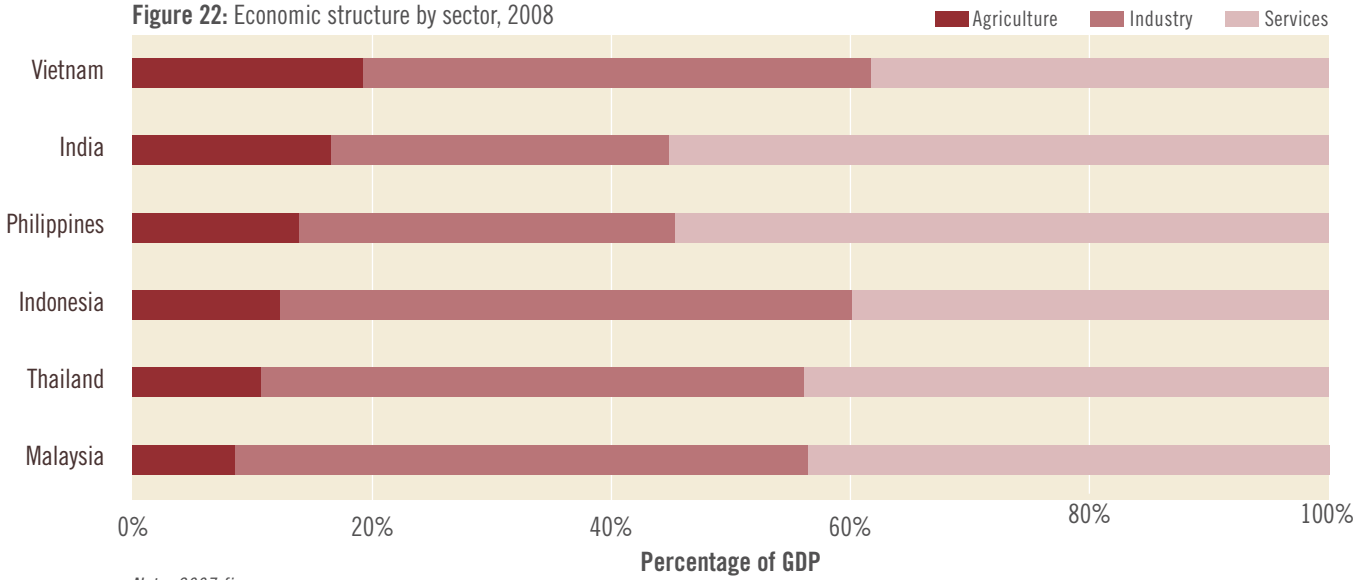
The level of economic development of the six countries differs significantly. In terms of GDP, India and Vietnam are classified as low-income countries; Indonesia, Philippines, and Thailand are classified as lower-middle income countries; while Malaysia is classified as an upper-middle income country (figure 21). Industry and services each comprise a larger portion of the countries' GDP relative to agriculture, although agriculture is still a significant portion of GDP, particularly in the low-income countries (figure 22).

Figure 21: Economic Overview, 2008



Note: GDP expressed in purchasing power parity and exchange rate adjusted, 2007 figures.
Source: International Monetary Fund, "World Economic Outlook Database, April 2008," 2008.

Figure 22: Economic structure by sector, 2008



Note: 2007 figures.
Source: World Bank, "Key Development Data and Statistics," 2008.

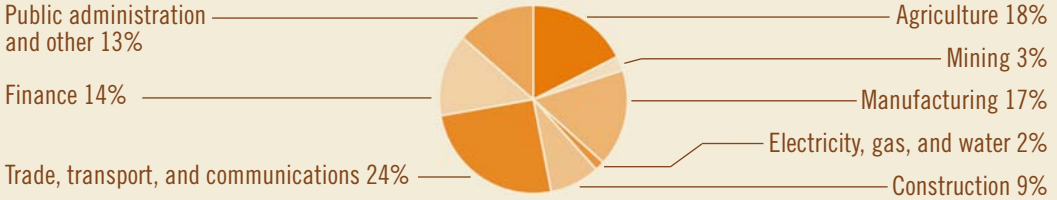
India

- India has the world's fourth largest economy (2007 nominal GDP: US$1.09 trillion) and the second highest population (almost 1.2 billion).[39]
- The government played a larger role in the economy until market-oriented economic reforms were introduced in 1991, which encouraged foreign investment and privatized some state-owned enterprises.[40]

Table 10: Key Trends in India

Trend	Sectors Affected
Water scarcity	Agriculture, food and beverage, manufacturing, power generation
Energy security	Power generation, oil and gas, automotive
Climate change	Power generation, oil and gas, agriculture

Figure 23: Economic sectors in India by percentage of GDP, 2007



Source: Asian Development Bank, "Key Indicators for Asia and the Pacific 2008: Country Tables," 2008.

Water Scarcity

Experts estimate that by 2020, India's demand for water will exceed all its sources of supply[41] and that by 2050, its gross water availability per capita will fall to as low as 1140m3/yr.[42] A level of water availability of less than 1,700 m3/yr is regarded as a potentially serious constraint.

India's agricultural sector, accounting for almost one-fifth of the country's GDP, is the principal user of the country's water resources. Currently, about one third of India's agricultural land is irrigated, almost double the world average, and if irrigation is expanded, the pressure on water resources will intensify.[43]

Meanwhile, factors such as climate change are diminishing the supply of water (through the recession of the Himalayan glaciers), at the same time as the demand for water is rising owing to increasing industrialization, urbanization, and population growth.[44] India currently does not have a consistent legal framework for dealing with water users' rights, though there is social pressure to favor people over industrial users in conflict situations.[45]

The operational costs in water-intensive sectors, especially those located in water-scarce regions, including agriculture, food and beverage, manufacturing, and power generation will rise as water becomes scarcer, and supplies may well be disrupted.

Water Scarcity and Coca-Cola In Kerala, India

In 2000, Coca-Cola opened a bottling plant in Palakkad, Kerala, India, which shared its water supply with local people and farmers. By 2002, the local water supply had become depleted or polluted, and the locals blamed Coke. In response, Coke claimed that its treatment of wastewater was adequate and instead blamed the reduced rainfall. Nevertheless, the public perception was that the company was responsible, and the ensuing protests and legal action caused the plant to be closed in 2004. In addition, the state of Kerala banned the manufacturing and consumption of Coke (and Pepsi) in 2006, although this ban was quickly overturned in court.[46]

This is a good example of reputational risk: the actual extent to which Coke, the local farmers, the lack of rainfall, or other factors contributed to the water shortage was irrelevant. Instead, the public perception that Coke was responsible resulted in legal fees, lost sales, and damage to its brand. Coca-Cola now has a water conservation policy to help mitigate the risk of loss of water supply. The policy states that "by 2010, it aims to return all the water it uses in its manufacturing processes back to nature."[47]

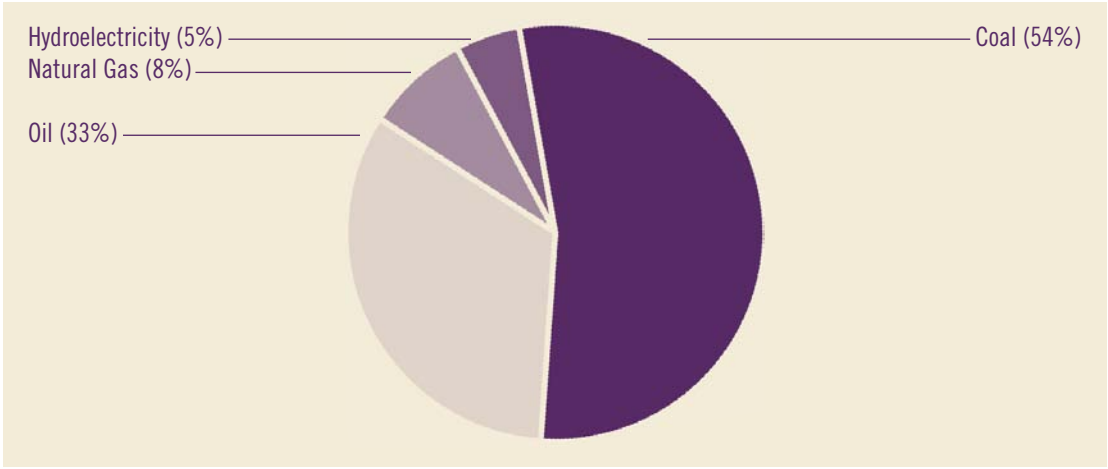
Energy Security

India faces a growing challenge in meeting its rapidly increasing energy needs, as it is heavily dependent on fossil fuels, especially coal and oil (figure 24). Although in the short term, the government plans to increase its production of coal and to focus on energy efficiency, in the longer term it plans to gradually stop using fossil fuels.[48]

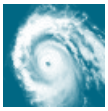
For a country already facing energy shortages, the expansion of supply and more efficient energy use will be critical to India's continued economic development. India's dependence on imports of fossil fuel (more than 70% of India's oil is imported) will make its expanding energy needs increasingly costly to meet. The Indian government generously subsidizes retail energy prices, although retail oil prices are still relatively high even with subsidies.[49] In early 2008, according to the international press the government was forced to increase retail oil prices by 10 percent, because even subsidized prices had become too expensive to maintain in the face of rising global oil prices.[50]

Companies in all sectors, especially energy-intensive ones like manufacturing, will need to evaluate their energy profile and find ways to reduce costs. India's power generation, oil and gas, and automotive sectors will likely face increasing pressure to invest in cleaner technologies.[51]

Figure 24: India's energy mix, 2007



Source: Energy Information Administration, 2007.



Climate Change

Although India's GHG emissions per capita are much lower than the world average and that of developed countries, the country is physically vulnerable to the impacts of climate change.[52] As a result of climate change, India will experience rising sea levels, changing rain patterns, and diminishing water supply. These physical impacts could lower agricultural output (up to 5% for a 1.5°C rise in temperature), which is highly dependent on traditional weather patterns, namely, the annual monsoon season.[53]

India just released its national climate change plan, but it does not establish national targets for either GHG reductions or energy efficiency. Energy-intensive sectors, however, are already being targeted by India's Bureau of Energy Efficiency, which is developing sector-specific energy efficiency benchmarks, beginning with cement.

A clear regulatory incentive to reduce emissions is conceivable in the future, especially if the United States and other developed countries begin reducing their own emissions more aggressively or provide more financial and technical support to countries like India to reduce emissions. Because they are large emitters, the energy sector (56% of emissions) and the agricultural sector (34% of emissions) will be the principal targets of regulation or other forms of government intervention.[54]

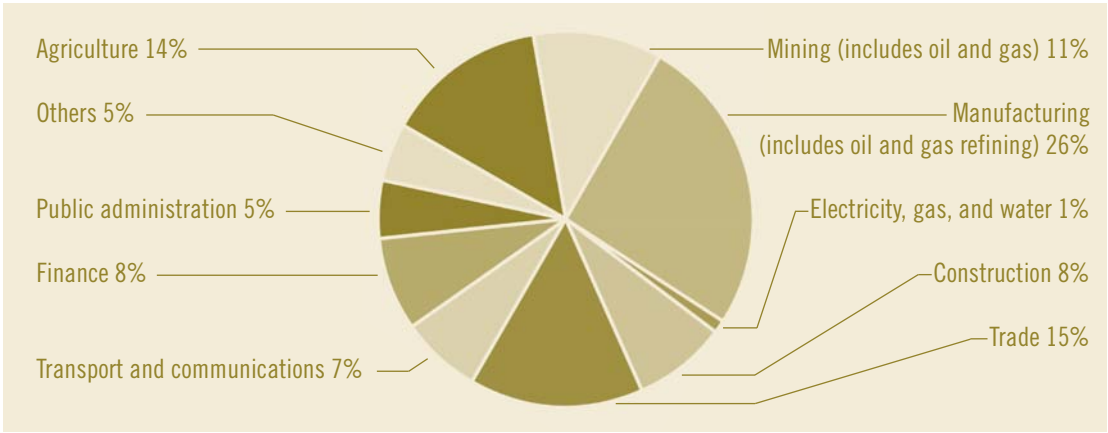
Indonesia

- Indonesia is the world's fourth most populous country, with 237 million people speaking 250 languages, spread across six thousand inhabited islands.[55]
- Indonesia's GDP grew by an average of 7 percent between 1987 and 1997, though the country's economy was slow to recover from the 1997/1998 Asian financial crisis.[56]
- The government still plays a significant role in the economy and controls the prices of fuel, rice, and electricity (figure 25).[57] Indonesia thus is at risk for price inflation, as the government struggles to keep pace with global price increases.

Table 11: Key Trends in Indonesia

Trend	Sector Affected
Food security	Agriculture, food and beverage, farming equipment, plantations, forest products, construction
Deforestation	Agriculture, forest products, palm oil
Climate change	Agriculture, food and beverage, power generation, transportation, oil and gas
Air pollution	Automotive, manufacturing, construction

Figure 25: Indonesia's economic sectors by percentage of GDP, 2007



Source: Asian Development Bank, "Key Indicators for Asia and the Pacific 2008: Country Tables," 2008.

Food Security

Rising global food prices could lead to social unrest in Indonesia. Even though it is the world's third largest producer of rice, according to press reports it recently banned almost all private exports in an effort to keep prices low for domestic consumers.[58] But as global prices rise, the government's budget will be strained to maintain current price levels for subsidized commodities like rice. Indonesia's population is vulnerable to price increases of staple products, because almost 5 percent of the population lives on less than $2 per day, and nearly 10 percent survive on less than $1 per day.[59] Indeed, the government fears food riots and other actions, and in its 2008 budget it increased the amount it would spend on food subsidies.[60] Another part of the government's plan to lessen its burden on imports is to achieve self-sufficiency in rice, which it claims it will do by the end of 2008.[61]

Self-sufficiency typically means increasing efficiency and productivity in the agricultural sector to offset the effects of unforeseen climatic events. But, it may also entail expanding agricultural land area, which would increase competition for land with forestry and construction companies. One result would be that companies producing fertilizers, high-yield seeds, and farming equipment might benefit from expanding and intensifying farming.

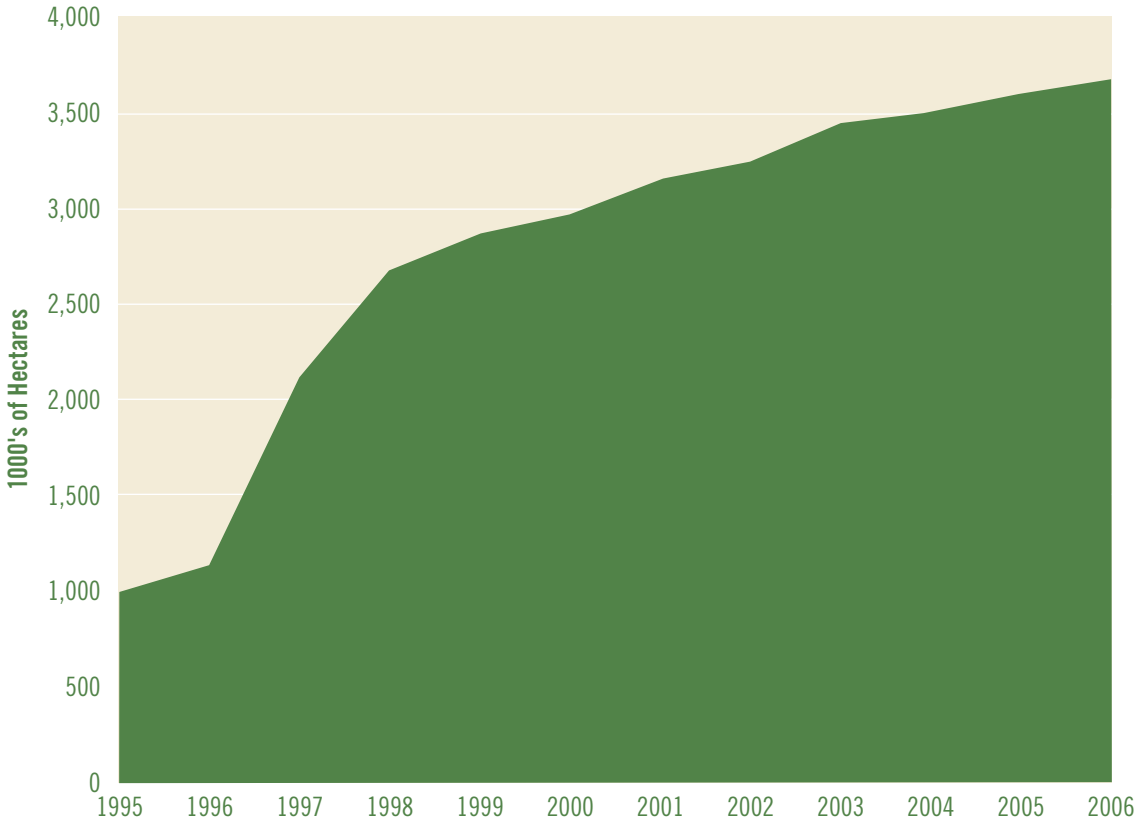
Deforestation

Indonesia's continuing deforestation and land conversion practices are helping increase the concentrations of greenhouse gases in the atmosphere. Even though half of Indonesia is covered by forests (which make up 10% of the world's forest cover), between 2000 and 2005 the country lost an estimated 0.7 million hectares of forest to deforestation.[62] This is a dramatic decrease from that of the period 1990 to 2000, but deforestation and land conversion still remain a significant environmental problem.[63]

In 2005, Indonesia was ranked the world's third largest emitter of greenhouse gases, after the United States and China, largely as a result of deforestation, peat bog degradation, and forest fires.[64] The forces leading to deforestation have intensified as the global thirst for palm oil for use in the biofuel, cosmetic, and food industries is intensifying the competition for land, often leading to the clearing of virgin rainforest.[65]

In 2007, Indonesia claimed to have overtaken Malaysia as the world's leading producer of palm oil (figure 26).[66] According to press reports, the country's domestic demand for palm oil is rising as well, as it tries to mandate the use of a 2.5 percent blend of biodiesel, to help lower its consumption of petroleum.[67] An estimated 80 percent of Indonesia's timber is harvested illegally.[68]

Figure 26: Land area of Indonesia's palm oil plantations, 2007



Source: Statistics Indonesia, 2007

Rampant overharvesting will reduce Indonesia's supply of high-quality timber, hurting sectors such as pulp and paper and wood products which depend on timber. The palm oil industry will have less access to land for expansion if efforts, such as global mechanisms to reduce land-based emissions, are made to preserve forests. The palm oil sector is subject also to supply chain pressures to stop illegal timber harvesting. Some global companies, like Unilever, have committed to purchasing "sustainable" palm oil, which by definition, should not contribute to deforestation.[69]

Staples and APP: Supply Chain Pressures on Emerging Market Companies

Staples, the U.S.-based world's largest retailer of office supplies, canceled its contract with a Singapore-based supplier, Asia Pulp & Paper Co. Ltd. (APP), in January 2008 because of its poor environmental performance. Although Staples bought only about 5 percent of its paper products from APP, it determined that the company was not improving its environmental management.

Environmental concerns

APP owns and operates one of Asia's largest pulp mills in Sumatra, Indonesia. Various reports have linked the company to illegal logging in virgin rainforests. Third-party audits have shown that a large concentration of the fiber in APP's products comes from high-conservation-value forests. Because Staples' paper procurement policy is intended to protect such forests by ensuring that its paper-based products contain an average of 30 percent postconsumer recycled content, APP's products were deemed unacceptable.

Staples takes action

Staples first tried to persuade APP to improve its environmental practices, including helping it create an action plan to become 100 percent dependent on plantations. But when APP changed management, it appeared to waiver from its previous commitments. Third-party audits showed no improvement, and when Staples investigated, the company became less forthright about its practices. Staples finally decided to sever its relationship with APP.

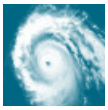
Value creation

APP has two publicly traded subsidiaries (mills): Pabrik Kertas Tjiwi Kimia Tbk (TKIM.JK) and Indah Kiat Pulp & Paper Tbk (INKP.JK). Both are traded on the Jakarta (Indonesian) stock exchange. Staples' share price did rise slightly after the company announced the end of its relationship; however, this rise was not significant, especially when examined over a longer time span or when compared with its peers' price movements. Many factors influence share prices, and negative news often has a more pronounced impact than does positive news.

Whether or not the stock market immediately recognized the benefits of this outcome, for Staples the ending of its relationship with APP was an important strategic decision. Continuing such a relationship would have damaged the integrity of Staples' paper policy and risked its reputation. Moreover, sudden negative news could have lowered its share price and/or damaged its relationships with customers. This episode thus gave Staples an opportunity not only to diversify its supplier base away from an underperforming company but also to turn the fiber source for some of its paper-based products away from trees. Staples now uses waste from cotton production to make file folders.

APP received bad press from the international media. Inevitably, though, other buyers with policies less stringent than Staples' will continue to buy from the company. Nevertheless, it is important to recognize that customers, like Staples, with strong environmental commitments will send strong market signals by creating conditional relationships that demand that certain standards be met. Supply chain pressure constitutes an important force for positive changes in corporate environmental practices in emerging markets.

Notes: This case was prepared with input from Mark Buckley, Vice President, Environmental Affairs, Staples Inc.



Climate Change

Given its volcanic geography and 54,716 km of coastline, Indonesia is already prone to violent natural disasters.[70] Between 2003 and 2005, the Indonesian government counted 1,430 natural disasters, including floods, landslides, and other geological disasters, whose social effects were exacerbated by Indonesia's high incidence of poverty.[71] Climate change is expected to increase the rate and severity of such events as well as result in more rainfall and flooding in coastal areas due to rising sea levels and temperatures. These changes, in turn, could threaten Indonesia's food security and livelihoods and raise the incidence of disease. Nonetheless, Indonesia is unlikely to decrease its emissions, given its dependence on (and planned expansion of) coal-fired power plants, as well as its continued deforestation and land conversion practices.

Those of Indonesia's sectors that depend directly on the environment, such as agriculture, tourism, and forestry, are vulnerable to physical risks. The agricultural sector, on which many Indonesians depend financially, and related sectors such as food and beverage will be significantly affected by lower yields. GHG-intensive sectors, such as electric utilities and transportation, may be altered by regulatory and market based measures aimed at reducing emissions, although domestic regulation is unlikely in the short term.

Extreme Weather "Submerging" Indonesian Industry

Over the past ten years, Indonesia has had an unusually high volume of natural disasters. In fact, government statistics show that Indonesia averages as many as 2.7 disasters—from floods to earthquakes to volcanic eruptions—per day each year! But imagine if things got worse.

The Intergovernmental Panel on Climate Change (IPCC) estimates that as a result of climate change, there is a more than 90 percent probability of heavier rain events and a more than 66 percent likelihood of extremely high sea levels globally. Because Indonesia is situated on an archipelago of 17,508 islands, its industrial sectors would be severely affected by any of these events. A World Bank report cites predictions of 2 to 3 percent more rainfall per year and a mean sea level rise of 0.57 centimeters per year in Jakarta Bay.[72] Rachman Witoelar, Indonesia's environmental minister, even predicts that by 2030, two thousand of Indonesia's islands would be submerged from rising sea levels.[73]

The floods in Aceh in December 2006 affected a half million people and created US$210 million in damage and losses, primarily in the infrastructure, housing, and agriculture sectors.[74] Three months later, the February 2007 floods left another half million people homeless and caused perhaps as much as US$1 billion in economic damage.[75]

Share prices of Indonesia's biggest telecommunications carrier, Telkom, its largest retail bank, Bank Central Asia, and its largest automotive conglomerate, Astra International, all fell after reports of the extensive damage to these companies' infrastructure.[76] Paskah Suzetta, Indonesia's national planning minister, stated that industry and trade GDP growth was expected to decrease by 0.59 percent as a result of the February 2007 flood. Clearly, extreme weather patterns can have immediate and devastating effects on a country's economy.

Effects of Climate Change

Phenomenon	Likelihood
Warmer days. Less cold days/nights	Virtually certain
More warm spells and heatwaves	Very likely
More heavy rain events	Very likely
More areas hit by drought	Likely
More intense tropical cyclones	Likely
More extreme sea levels (not tsunamis)	Likely

Probability definitions:
Virtually certain: over 99%
Very likely: over 90%
Likely: over 66%
Source: IPCC

Air Pollution

Air pollution has become so serious in Indonesia that it is already having major repercussions on human health. Moreover, the economic costs of air pollution are estimated to be US$400 million per year, a figure estimated to rise into the billions in the next few years.[77] Indonesia's fourth leading cause of death is lower respiratory infections, largely caused by exposure to polluted air, whose main sources are vehicles, industry, domestic sources, and forest fires, with different sources responsible for different types of gases.[78]

The Indonesian government's efforts to curb air pollution may result in higher costs to polluting sectors, such as motorcycle, automobile, and manufacturing. Investing in new, or retrofitting existing, equipment likely will be financially supported by government through taxes or other incentives. Sectors located in highly polluted cities like Jakarta, with outdoor workers, such as in construction, will find worker productivity and recruitment to be more expensive.

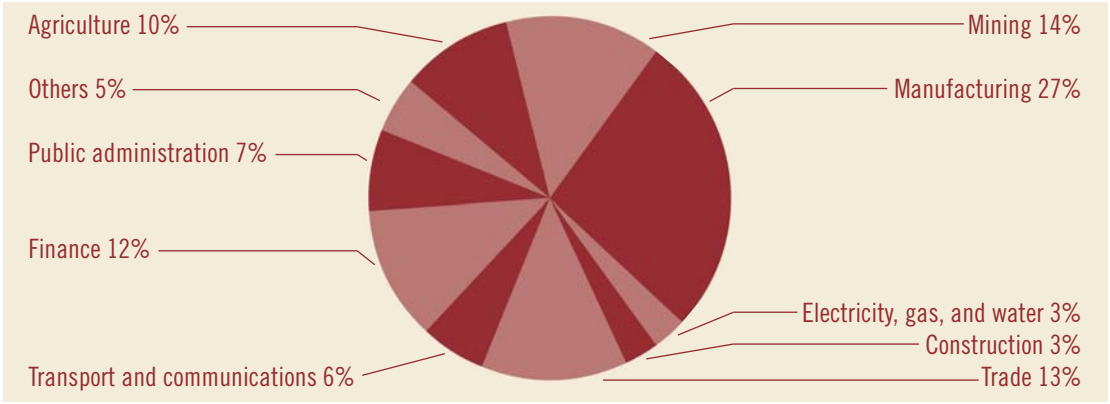
Malaysia

- Malaysia is classified as a newly industrialized country, and it has the highest GDP per capita of all the countries examined in this report.[79]
- The Malaysian government controls the prices of 30 percent of its goods. Its current plans are to refocus the economy toward higher-technology products, with the goal of becoming a fully developed economy by 2020.[80]
- Malaysia also occupies a strategic geographic position as one of three countries controlling the Strait of Malacca, arguably the world's most important shipping lane.

Table 12: Key Trends in Malaysia

Trend	Sector Affected
Food Security	Agriculture, food and beverage, farming equipment, plantations, forest products, construction
Deforestation	Agriculture, forest products, palm oil
Water Scarcity	Agriculture, food and beverage, power generation, electronics manufacturing, palm oil processing

Figure 27: Malaysia's economic sectors by percentage of GDP, 2007



Source: Asian Development Bank, "Key Indicators for Asia and the Pacific 2008: Country Tables," 2008.

Food Security

Malaysia now imports a third of its rice; rising global commodity prices may lead to further deforestation, to make room for more rice fields. Since the 1980s, Malaysia's production of rice has fallen, whereas that of fruits and vegetables, often bound for export, has risen substantially.[81] Owing to the recent rise in food prices, Malaysia reportedly announced a plan to spend US$1.3 billion to turn Sarawak, home to a tropical rainforest, into a "rice bowl."[82]

The Malaysian government's plan to increase domestic rice production may affect several sectors. Turning tropical rainforest into rice paddies will reduce the amount of land available to the forestry, palm oil (exports worth US$13.6 billion in 2007), and related sectors, potentially making it more costly for them to expand.[83] As the agricultural sector expands, firms producing high-yield seeds, fertilizer, and farming equipment will benefit from the higher sales.

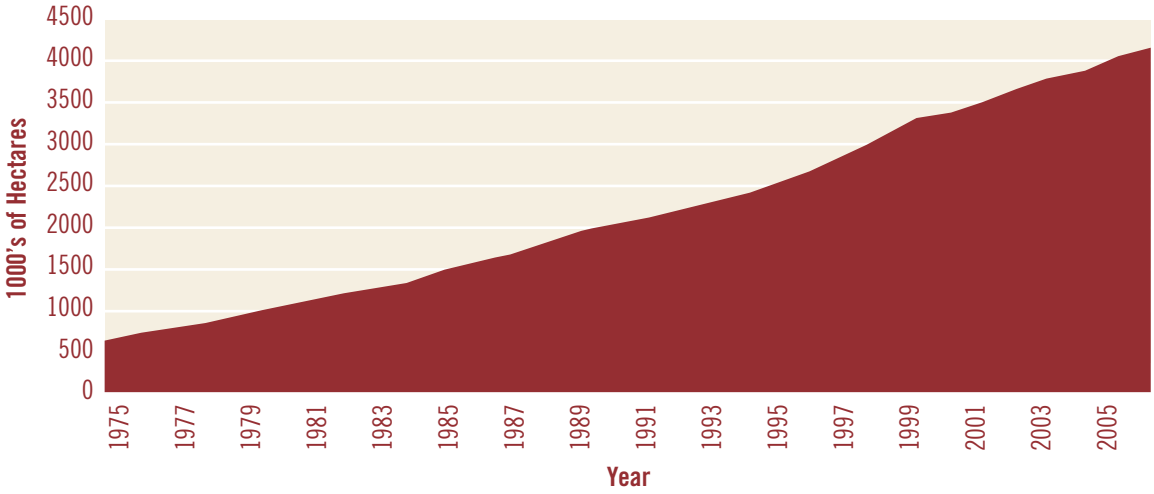
Deforestation

Malaysia has one of the world's highest rates of deforestation. Although forests still cover 63.6 percent of the country (though only 12 percent are considered pristine), Malaysia's forest cover has fallen by 7 percent since 1990, with even greater losses between 1950 and 1990.[84]

As the world's largest exporter of tropical hardwood, logging still is a major contributor to deforestation, even though logging activity has slowed in recent years, as many original forests have already been harvested and now only certain trees are targeted for cutting.[85] The major threat to Malaysia's remaining forests is forest clearing for agriculture and palm oil plantations (figure 28).

As in Indonesia, the palm oil industry will have less access to land for expansion if efforts to preserve Malaysia's forests, such as global mechanisms aimed at reducing land-based emissions of CO_2, intensify. Moreover, the Malaysian government has recently made rice production a priority in Sarawak, which will limit the amount of land available for palm oil plantations in this region. The palm oil sector is also subject to supply chain pressures to stop planting on forested land, as some global companies, like Unilever, have committed to purchasing "sustainable" palm oil.[86] The sector, thus, may be forced to focus on increasing yields on existing land, as opposed to continually expanding into forests.

Figure 28: Planted area of palm oil plantations in Malaysia (2007)



Water Scarcity

Although Malaysia is rich in water resources, the northwest, where much of the country's industry is located, has relatively little water. This region's recent scarcity of water has been attributed to population growth, urbanization, industrialization, and the expansion of irrigated agriculture.[87] The geography of this area also means that it is subject to seasonal water deficits, which have resulted in conflicts among the users.[88] In addition, the northwest's high concentration of urban, agricultural, and industrial land use has led to degradation in water quality.

Sixty percent of Malaysia's polluted rivers are located near industrial areas, which translates into less availability and higher costs for filtering.[89] Less availability of clean water will lead to more competition for access and higher costs for water-dependent sectors, such as agriculture, electronics manufacturing, and palm oil processing. The main sources of water pollution in Malaysia are domestic and industrial sewage, effluent from palm oil mills, rubber factories, and animal husbandry.[90] As clean water becomes more valuable, those sectors contributing to poor water quality will likely be forced to retrofit, invest in new equipment, or pay higher fees.

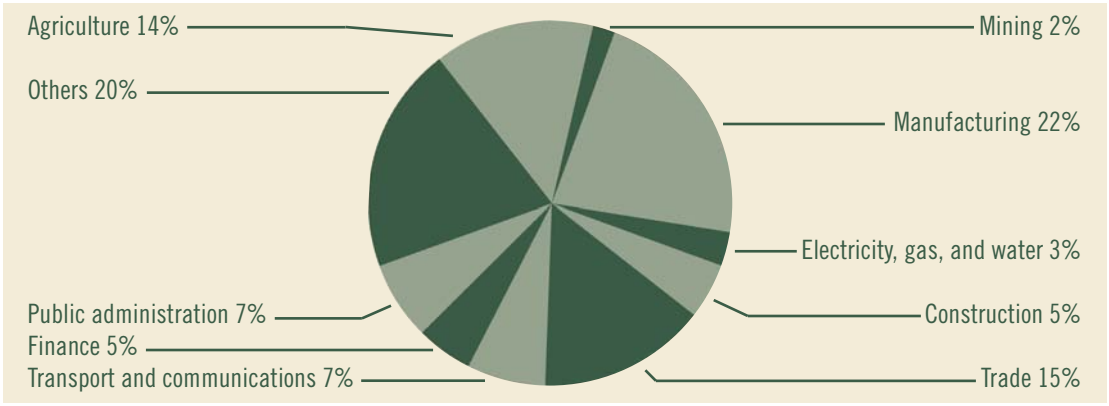
Philippines

- The population of the Philippines is 91 million, plus at least 8 million Filipinos living outside the country. In 2007, remittances from overseas Filipinos totaled US$17 billion, or 12 percent of GDP.[91]
- English is the Philippines' official language, and the country is the third largest English-speaking country in the world.
- Economically, the Philippines has underperformed its neighbors, owing to its smaller manufacturing sector, fewer exports and investments, and poor infrastructure and governance (figure 29).

Table 13: Key Trends in the Philippines

Trend	Sector Affected
Food security	Agriculture, food and beverage, farming equipment, plantations, forest products, construction
Deforestation	Agriculture, forest products, palm oil
Climate change	Agriculture, food and beverage, manufacturing, power generation, transportation. Oil and gas
Air pollution	Automotive, manufacturing, construction, power generation, oil and gas, cement, chemical

Figure 29: Key economic sectors by percentage of GDP in the Philippines, 2007



Source: Asian Development Bank, "Key Indicators for Asia and the Pacific 2008: Country Tables," 2008.

Food Security

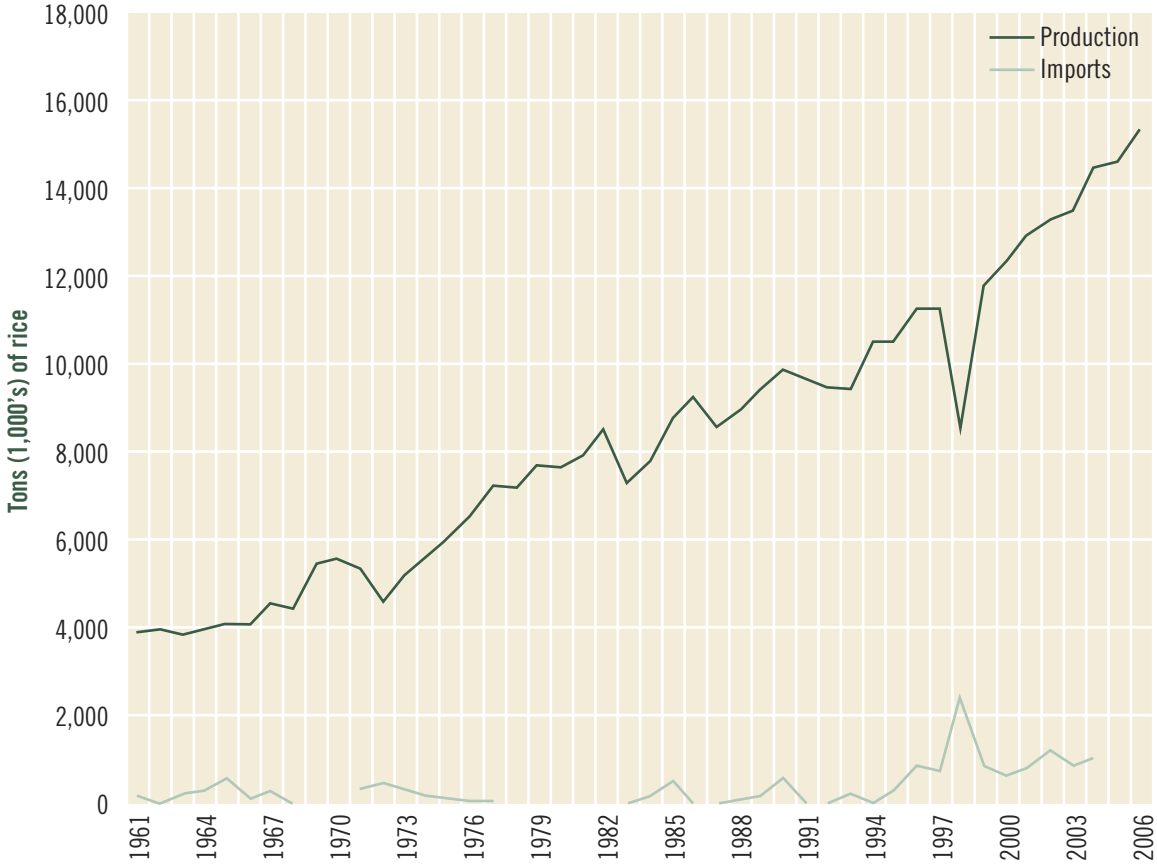
In the current crisis of rising global food prices, the Philippines has been among the countries hardest hit, since it is the world's largest rice importer, importing about 10 percent of its national requirement (figure 30).

Illustrative of how serious the situation has become, the press reports that rice hoarders can be charged with economic sabotage, punishable by life imprisonment.[92] The Philippines' domestic rice-growing capacity is declining, mostly due to land conversion, while its population continues to grow.[93] In response, the government reportedly plans to allocate another 1.1 million hectares for rice production and to provide more than US$1 billion for fertilizer, seeds, irrigation, and infrastructure like roads and postharvest facilities.[94]

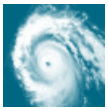
In the meantime, the government will subsidize the cost of imports. The country's plan to expand and intensify rice farming, however, may be tempered by any further changes in climate.

Depending on the location of the land that the government decides to allocate to agricultural production, other competing users (such as construction companies) will have less access to land. Meanwhile, the agricultural sector (14% of GDP), including farmers and companies producing fertilizer, seeds, equipment, and other supporting products, will benefit from the government's investment in, and support for, the sector.

Figure 30: Rice production and imports in the Philippines, 1961–2005



Source: International Rice Research Institute (IRRI), "Recent Trends in the Rice Economy," 2006.



Climate Change

With its seven thousand islands and 34,000 km of coastline, the Philippines is geographically vulnerable to the effects of climate change, such as tropical cyclones, excessive rains, landslides, intense typhoons, floods, mudflows, forest fires, droughts, and a reduction in water resources. The Philippines has given priority to adaptation measures, as opposed to mitigation, given that it is not responsible for a large share of global emissions. The government has also been promoting energy efficiency in energy-intensive sectors such as transportation and agriculture.

The sector most affected by climate change, and vital to the country's food security, is agriculture. Upland farmers who rely on rainfall for their water supply will be particularly affected by any change in rain patterns caused by climate change. Agricultural productivity, however, may be enhanced in other areas with increased rainfall. There will be more severe storms, which can damage agricultural land as well as buildings and infrastructure.

The effects of climate change may limit the potential growth of the tourism sector if there is less international air travel and more extreme weather.[95] With respect to mitigation, the government is targeting energy-intensive sectors, like power generation, transportation, and manufacturing, for more efficiency. The government may even underwrite investments in more efficient technology. High-emissions sectors like cement and metal processing may also be targeted for upgrades of emissions control technology. Renewable energy technologies, such as geothermal, would create opportunities for both investors and energy companies.[96]

Deforestation

Deforestation in the Philippines has been severe. Once 95 percent of the country was covered by forests, but now forest cover has been reduced by an estimated 97 percent, as figure 31 shows in green.[97]

Whereas forestry accounted for 1.7 percent of the Philippines' GDP in 1986, its share had fallen to a miniscule 0.1 percent by 2006.[98] This deforestation was caused by illegal logging and land conversion for urban use.[99] In addition to representing lost economic opportunities—like carbon sequestration, among other valuable uses—the loss of forests is threatening the country's rich biodiversity as species lose their natural habitats.[100] Other consequences include increased vulnerability to floods and droughts, as well as soil erosion and groundwater depletion.

The forestry industry in the Philippines has already shrunk as a result of unsustainable logging practices and land conversion. To preserve the country's remaining natural forests, the industry must engage in more sustainable practices.

Figure 31: The Philippines' remaining forests, 2005

Source: Food and Agriculture Organization, "Forest Cover Map: Philippines," 2005.

Air Pollution

The Philippines' urban areas are home to most of its people (65%) and industry (47.3% of manufacturing facilities are located in metropolitan Manila), which has degraded local air quality.[101] Poor air quality is estimated to cost the country US$1.5 billion per year in urban health care costs, mostly from premature death and chronic respiratory illnesses.[102] In response, the Philippine government enacted its Clean Air Act in 1999 in an effort to improve air quality, and it includes improving vehicle emissions inspection and maintenance, as well as strengthening regulatory enforcement.[103] The government has offered some companies tax incentives or loans to install pollution control devices and is also said to be in favor of imposing fees for emissions.

The Philippine government has already required companies in the power generation, oil and gas, cement and chemical sectors to install continuous emissions-monitoring systems, which has necessitated investment by companies in these sectors but which is at least partially supported financially by the government.[104] As the government explores ways to further improve air quality, companies in high-emitting sectors will likely have to make further investments in clean technology to avoid emissions fees or other regulatory costs.

Manila, Philippines

Thailand

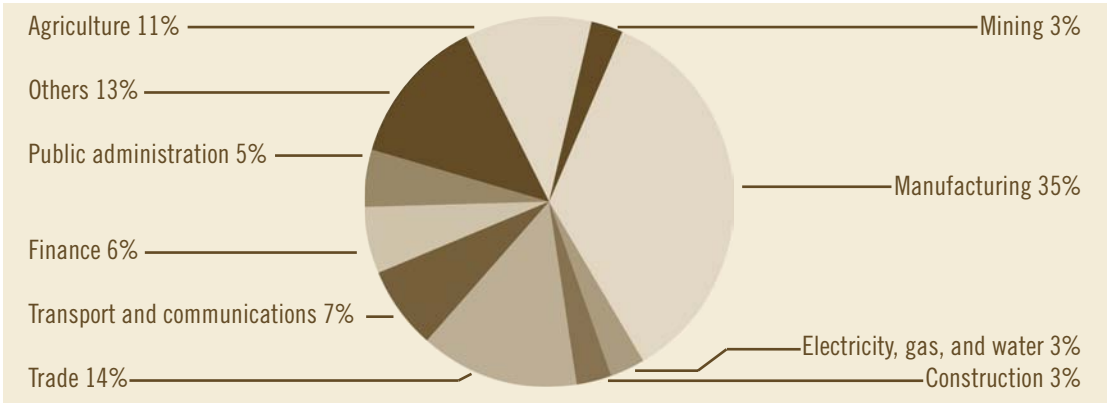
- Thailand's economy (figure 32) is highly dependent on exports, which account for more than 70 percent of GDP, concentrated in the automobile, petrochemical, and electronics sectors.[105]

- Although the Thai economy was hurt by the Asian financial crisis in the late 1990's, a tsunami in 2004, and a coup in 2006, the country's economy appears to have recovered, largely owing to exports.

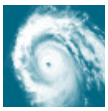
Table 14: Key trends in Thailand

Trend	Sector Affected
Climate change	Agriculture, food and beverage, manufacturing, power generation, transportation, oil and gas
Water scarcity	Agriculture, food and beverage, power generation, electronics manufacturing
Deforestation	Agriculture, forest products, tourism
Energy security	Power generation, oil and gas, automotive

Figure 32: Thailand's key economic sectors by percentage of GDP, 2007



Source: Asian Development Bank, "Key Indicators for Asia and the Pacific 2008: Country Tables," 2008.



Climate Change

Due to both its coastal geography and its population distribution, Thailand is vulnerable to the effects of climate change. A rise in temperature and sea level will increase the incidence of floods and droughts.

Thailand's population is still largely rural, concentrated in the rice-growing areas of the central, northeastern, and northern regions. In fact, about a third of the population lives in the northeast, an area already prone to floods and droughts but crucial to the country's food production, as it contains half the country's rice fields.[106] Accordingly, Thailand's mitigation efforts will likely focus on the energy, forestry, and agricultural sectors and include changing building codes for energy efficiency, reforestation projects, energy audits for industrial motors, and the use of mineral fertilizers.[107]

Thailand's production of rice and other food is vulnerable to the effects of climate change, threatening the country's self-sufficiency in rice. The largest emitters of GHGs in Thailand are the power generation, transportation, and forestry sectors. The government would likely intervene first in these sectors. In the short term, when equipment is replaced or processes are changed, any mitigation efforts will raise the costs for companies in these sectors. In addition, changes in the weather and gas prices, as well as infrastructure damage caused by extreme weather events, may hurt the country's thriving tourism sector.

Water Scarcity

Thailand has one of Asia's lowest annual availability of renewable water resources per capita, making the availability and quality of water an important environmental and economic issue.[108] The northeast where, again, a third of the population lives and most of the rice is grown, suffers frequent droughts and floods. To manage the scarcity of water in these regions, experts believe that Thailand will have to begin to transport water from abundant to scarce areas. This will mean higher costs for water in scarce regions, especially as oil prices continue to rise.[109] In addition, the government is likely to implement a water demand management strategy that would clarify the rights and liabilities of users and subject them to taxes.[110]

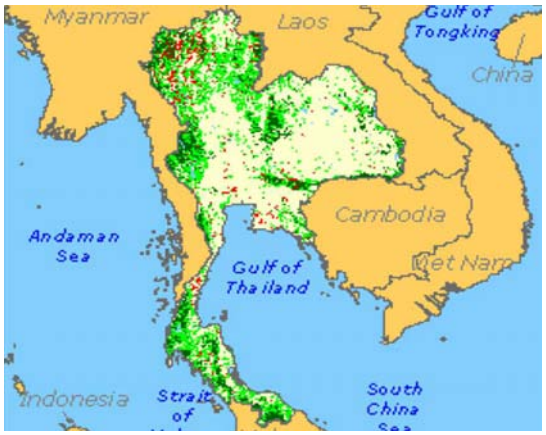
Thailand's most important manufacturing sectors, such as computers and electronics, as well as its vital agricultural sector (11% of GDP), are highly dependent on water. Consequently, they will likely face higher water-related costs. This rise in rates will likely also encourage water-dependent companies to invest in more water-efficient equipment and processes.

Deforestation

Thailand has lost a significant amount of its natural forest cover (figure 33). In 1961, forests covered 53 percent of Thailand's land area, but now this figure is 28 percent, a dramatic loss, due mainly to the conversion of land to agricultural and urban areas and logging, both legal and illegal.[111] Because of government intervention, the rate of deforestation has fallen to 0.6 percent per year, but the pressures remain as Thailand continues to industrialize and its population continues to grow.[112]

Most of Thailand's forests have been lost, and the sector's long-term viability in this country is precarious. The tourism sector is heavily reliant on the country's natural beauty and thus also has a stake in preserving Thailand's forests.

Figure 33: Thailand's remaining forests, 2005



Source: Food and Agriculture Organization, "Forest Cover Map: Thailand," 2005.

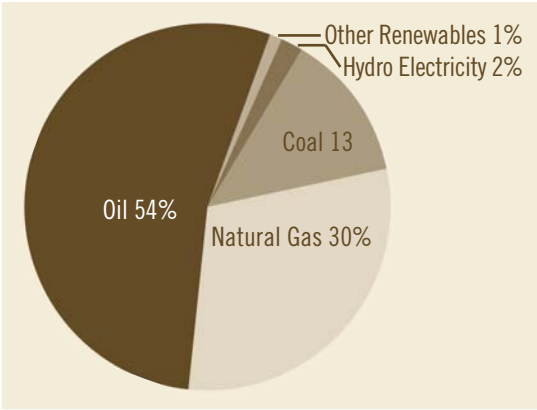
Energy Security

Thailand is highly dependent on fossil fuels, mostly imported, to meet its energy needs, thereby making it vulnerable to rising oil, coal, and natural gas prices.

In 2005, the Thai government introduced its National Energy Strategy to redirect the country's energy sources toward renewables and to support the development of new technologies for energy conservation.

As Thailand expands its domestic sources, those companies developing the country's renewable energy sector, as well as producing or installing energy-efficient technology, will likely benefit from government support and financial incentives.

Figure 34: Thailand's energy mix, 2007



Source: Energy Information Administration, 2007.

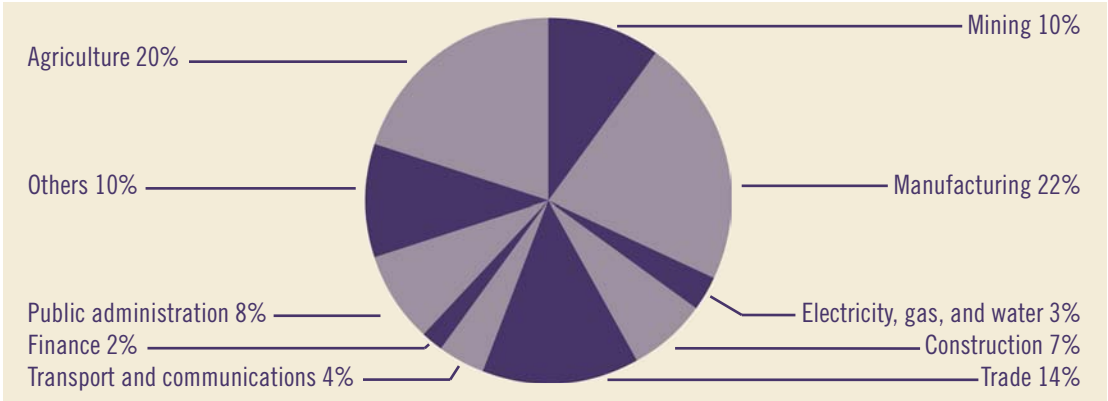
Vietnam

- Vietnam has one of the world's fastest-growing economies. Its industrial production has led to recent annual GDP growth rates of more than 7 percent and, in 2007, GDP grew by an astounding 17 percent.[113]
- The country began transitioning from a centrally planned to a market economy in 1986, though it remains socialist at the political level.
- The rapid privatization of Vietnam's state-owned companies has been dramatic. The private sector, which did not exist twenty years ago, now accounts for more than 60 percent of GDP.[114]

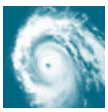
Table 15: Key Trends in Vietnam

Trend	Sector Affected
Climate change	Agriculture, food and beverage, manufacturing, power generation, transportation, oil and gas, forest products
Deforestation	Agriculture, forest products
Air pollution	Automotive, manufacturing, construction, steel, power generation

Figure 35: Vietnam's key economic sectors by percentage of GDP, 2007



Source: Asian Development Bank, "Key Indicators for Asia and the Pacific 2008: Country Tables," 2008.



Climate Change

Experts predict that Vietnam will be one of the countries most hurt by climate change.[115] Vietnam's 3,260 km coastline and two of the world's largest low-lying deltas make it highly vulnerable. A rise in sea level of only one meter could inundate almost 10 percent of the country and displace more than 22 million people.[116] Experts have determined that in the past decade, the country already experienced a small rise in temperature and sea level, greater variability in its rainfall, and more frequent storms and floods.[117]

Vietnam is currently developing a national strategy to address climate change, which may include reducing the country's reliance on fossil fuels, launching reforestation projects, and promoting energy efficiency.

Experts recently noted that climate change already has damaged many of Vietnam's economic sectors, including agriculture (20% of GDP), forestry, aquaculture, hydroelectric power, oil and gas production, and sea transportation.[118] As the physical effects of climate change intensify, these sectors will likely be significantly financially affected. The government's mitigation plan will likely target those sectors with high GHG emissions and force them to invest in cleaner technologies. This would present opportunities to bring more energy-efficient and less carbon-intensive technologies to market, likely with some government support.

Deforestation

Rapid deforestation in Vietnam is now threatening some key economic sectors. More than 60 percent of the country was originally covered by forests. Experts estimate that deforestation - caused by war, logging, population growth, energy production, and land conversion - has lowered that figure to somewhere between 10 to 30 percent today (figure 36).[119] In response to this loss, the government intends to increase forest coverage by 5 million hectares.[120]

For Vietnam, a major concern is illegal logging, which has put the global forestry industry's long-term viability at risk. Given the prevalence of illegal logging in Vietnam, the country's forestry sector could lose sales as the global demand for legally sourced wood products rises. But sourcing from legal plantations would increase costs and make it difficult for the sector to maintain current production rates. Plantation forestry in Vietnam is expensive because land suitable for plantations is already in use, and the remaining available land is scattered, which would increase the costs of harvest and transport.

Figure 36: Vietnam's remaining forests, 2005

Source: Food and Agriculture Organization, "Forest Cover Map: Vietnam", 2005.

Air Pollution

The polluted air in Vietnam's two main cities, Hanoi and Ho Chi Minh City, is having major impacts on both the inhabitants' health and the economy. A recent study of Ho Chi Minh City showed that more than 90 percent of children under the age of five suffer from respiratory illnesses.[121] Transportation and industry are the major causes of air pollution, as few people take public transit (only 3% in Ho Chi Minh City) and motorbikes are the dominant form of transportation.[122] Vietnam does have vehicle emission standards, but they are weak compared with those of developed countries.

Certain industries have been singled out as the largest sources of certain gases: construction (total suspended particulates), steel production (CO_2), and power plants (NO_2, SO_2, and HC pollutants).[123]

If the Vietnamese government decides to address the country's air-quality issues, these sectors would likely be targeted to make investments in cleaner technology. Standards and measures already are in place to control air pollution in certain sectors. For example, construction companies face fines in Hanoi for sites that create dust pollution.[124]

IV

Corporate Environmental and Social Reporting In Emerging Asia

As we have seen, the impacts of environmental degradation are already being felt in Asia, and are increasingly relevant for companies' bottom lines. The main vehicle for revealing companies' performance, and a key tool for investors, is corporate sustainability reporting (CSR), covering environmental, social and related economic issues. While such reporting is now commonplace in Europe, the U.S., and other developed markets, it still lags behind in emerging economies.

*In a separate study, "*Undisclosed Risk: Corporate Environmental and Social Reporting in Emerging Asia*", WRI examined the corporate environmental and social disclosure practices of the ten largest companies (by stock market capitalization) in India, Indonesia, Malaysia, Philippines, Thailand, and Vietnam. In this section, we present some salient points from that study on the state of extra-financial corporate disclosure and its integration into company valuations in our six focus countries.*

The ten largest companies in each country included both multinational and national businesses, and covered a variety of sectors ranging from resource-based energy and gas, and mining and oil corporations to service sector transportation, banking, and telecommunications to manufacturing sector consumer goods. The companies were ranked according to a four point criteria developed by WRI which draws on guidelines from the Global Reporting Initiative[125] and from the international consultancy SustainAbility's Global Reporters work.[126]

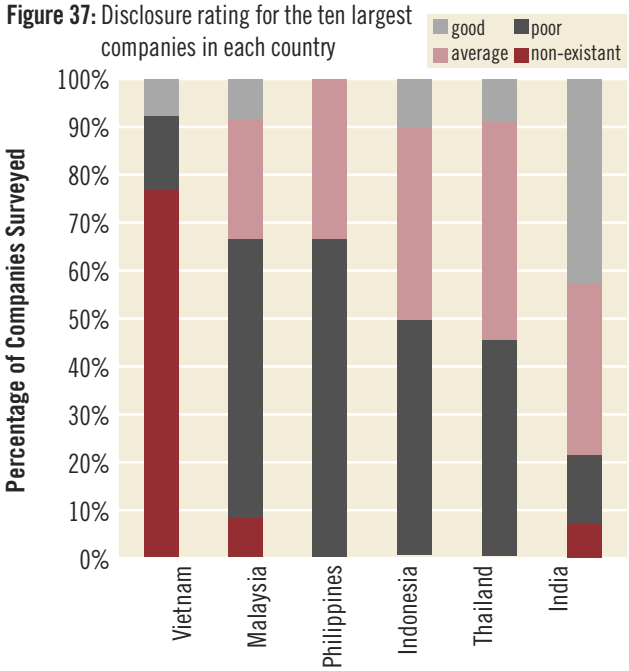
Asian Companies and Investors: Fact File

- Half the companies surveyed are concentrated in three sectors. Banks accounted for 20 percent of all companies surveyed; oil and gas and utilities each accounted for 15 percent.
- Only three of the companies surveyed are multinationals.
- The majority of investors in the six focus countries' stock exchanges are domestic (average of 58 percent) and institutional (average of 74 percent).

Reporting Evaluation Results

Indian companies had the best English language environmental and social disclosure, and much of it is integrated in company annual reports rather than in separate CSR reports (figure 37). Many of the Indian companies surveyed are globally competitive firms. As their reporting is also intended for stakeholders outside the country, these companies are more likely to adopt global best practices in environmental and social reporting. English is also an official business language. Environmental and social reporting in Indonesia, Malaysia, Philippines, and Thailand, was limited and focused mostly on community action and philanthropy in areas such as education, disaster relief, and public health. Vietnamese companies had the least progressive disclosure, with many companies providing no information on their environmental or social impacts.

Figure 37: Disclosure rating for the ten largest companies in each country



Sources: World Resources Institute, based on evaluations of company data.

Other Key Findings

- In Asia, the concept of "corporate social responsibility" seems to be understood largely as referring to the firm's philanthropic activities in the community. The content of their disclosure is likely to be more useful to stakeholder groups such as local communities and employees than to investors. Part of this is due to the fact that, guided by a collectivist and community oriented culture, Asian companies are stronger on the social aspects of the environmental, social and governance (ESG) agenda, and therefore have more to report on the social aspects.

- The majority of environmental and social information disclosed by the sixty companies surveyed is of limited relevance to the investment community. It does not meet investors' needs for time horizons beyond 12 months, forward looking data sets, and explanations of the materiality of environmental and social issues in business terms. The lack of financially relevant information means relevant sustainability risks are, in effect, hidden from those who invest in a company's stock.

- Environmental and social reporting in the six focus countries has improved in recent years through the efforts of national securities regulators, accounting professional associations and others. Mandatory drivers, such as stock exchange listing requirements, have provided a good first step. But these requirements have not been sufficiently prescriptive to result in environmental and social reporting that meets investor needs. The business reasons for environmental and social reporting, such as reputation, supply chain or stakeholder demand, have been stronger drivers for quality reporting.

- Some patterns emerged among companies with above average reporting. In many cases, either the company operates in a sector with high environmental risks, such as oil and gas; or, the company is a subsidiary of a large multinational company headquartered in a developed country; or, the company has ambitions to compete globally; or may be responding to supply chain reporting requirements. In these situations, external stakeholder demands have a high and positive impact on reporting quality.

- Each country, with the exception of Vietnam, has in place some mechanism - regulations, codes, awards, support organizations, or market initiatives - that encourages environmental and social reporting. On one end of the regulatory spectrum, the Malaysian stock exchange requires all listed companies to report publicly on their environmental and social performance, though the form the reporting can take is flexible. On the other end, Vietnam has no regulations relating to corporate sustainability reporting.

- Overall, in all six countries, more complete reporting would rebalance the information dissymmetry and thereby would help increase the flow of capital to environmentally and socially sustainable companies, as well as the likelihood of superior investment returns for investors.

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For this report, the authors reviewed an extensive number of internal sources, including WRI's own Earth Trends and CAIT databases, and consulted with senior WRI staff working on climate, forestry, and ecosystem services. Externally, the authors primarily turned to reports of the World Bank, ADB, IMF, UN, and IFC, as well as data from the national stock exchanges in the six focus countries.

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Access: Empower people and support institutions to foster environmentally sound and socially equitable decision-making.

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