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Environment and Development: The Thai Experience*

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It is widely debated whether environmental quality improves as an economy develops. Those holding that it does base their arguments on the observation that economic development in its early stages tends to rely on the exploitation of natural resources. As an economy is restructured toward high-tech industrialization, however, the resultant broader technological and socio-economic options promote sustainable development (Macris 1993).

The relationship between economic development and a cleaner environment is optimistically presented in a study by Grossman and Krueger (1992). The study concludes that air-borne particulate and sulfur dioxide pollution increase with Gross Domestic Product (GDP) up to about US$5,000 per capita a year. Beyond that point pollution allegedly begins to decline. Those who believe, on the contrary, that uncontrolled development harms the environment cite the Stockholm Environment Institute studies which indicate that emissions of carbon monoxide tend to increase, not decline, with per capita rises in GDP.

THAILAND'S GROWTH AND DEVELOPMENT

From 1987, Thailand attained double-digit real growth rates for three consecutive years and has now emerged as one of the world's fastest growing economies. Although growth is estimated to slow throughout the 1990s, and it has indeed since 1990, the economy is still expected to expand at a rate of 7-8 percent a year. The agricultural sector, which was Thailand's engine of growth in the 1970s, was replaced by manufacturing in the 1980s. In 1991, the manufacturing sector accounted for more than three-quarters of Thailand's export earnings.

Thailand has been relatively successful in curbing its annual population growth rate, which dropped from 3 percent before 1980 to 1.4 percent by the end of 1991. As a result, per capita GDP growth remains relatively high at US$1,812 in 1992 (preliminary estimate).

During the high growth period, the economy suffered various setbacks, including during the Gulf War. The most severe test for the nation's social fabric was the bloody military crackdown in May 1991. Political stability was, however, rapidly restored and an elected government is now ruling the country.

The political disturbances have not distracted the Thai people's attention from environmental issues. On the contrary, public awareness of environmental issues is high. Environmental problems are not only physical and economic, but are also social issues. While the rich can, to a certain extent, use their wealth to escape from the decline in the quality of the environment, i.e., by staying in air-conditioned surroundings or by escaping at least temporarily to cleaner locales, the poor generally have no choice but to live with environmental degradation. As will be discussed later, the quality of life and the health of the poor and the uneducated is often severely affected by industrial and urban pollution.

MANIFESTATIONS OF ENVIRONMENTAL DEGRADATION

Deforestation and Land Degradation

Once a land-abundant country, Thailand since the early 1980s has begun to feel the pinch of land scarcity. The land/man ratio stopped increasing in the late 1970s. As the late 1980s ushered Thailand into a period of rapid economic growth, brightening the country's prospects for becoming another NIC (newly-industrialized

country), land prices, both rural and urban, began skyrocketing.

Land and forest are inter-related resources. Expanding land uses, particularly for agriculture, almost invariably mean a depleting forest cover. The last three decades have seen Thailand's once thick forest cover rapidly depleted by about half. Thailand's average annual rate of forest loss, at 3.85 percent a year from 1976 to 1982, is one of the highest among all tropical countries worldwide.

Logging and improving roads in rural areas made opening up more and more land for agriculture, particularly for field crops, easier and more profitable. From 1960 to 1990, Thailand's agricultural population increased by 14 million, while 90 million rai (14.4 million hectares), or about half the country's total forests, was cleared at the calamitous rate of some 3 million rai (480,000 hectares) per year, or 6.4 rai-slightly more than one hectare for each person added to the agricultural population. New farm lands opened in the country's highlands have caused soil erosion, sedimentation, fertility loss, water logging and many other serious problems.

Thailand's forest cover, which was 50 percent of the country's total land area in the 1960s, is now reduced to 26 percent. Failures to account for resource depletion adjustments suggest that the real GDP was overstated by one to two percent, depending on the adjustment methods used (Sadoff 1992).

Another study suggests that forest loss is a major cause of CO_2 emissions into the atmosphere (TDRI/TEI 1993). Between the 1970s and the 1980s, fully two-thirds of Thailand's CO_2 emissions resulted from deforestation. In 1989, the same study estimates Thailand's per capita emission of greenhouse gases at 0.27 tons.

More importantly, Thailand has around one million families living in natural forest reserves. Forest degradation is thus not only an environmental issue but also an increasingly serious social and political problem. Conflicts between the government, which claims jurisdiction over government forest land, and the poor, who occupy that land and earn their livelihood from it, have become increasingly hostile. Yet it is not only landless farmers but also major land speculators who continue to encroach on forest land. Although the current government has continued the ban on logging and yielded to the demand of the landless for the right to use degraded forest land, what is lacking is the foresight and management needed for a solution that prevents further forest encroachment while ensuring sustainable social and ecological balance.

Water Resources and Pollution

The average annual rainfall for the last decade in Thailand's northern region, which is the source of water for two of the country's largest dams, is significantly below the average for the last four decades (TDRI/TEI 1993). This year, in fact, water levels in the country's largest dams have reached an all-time low.

Conflicts between upper and lower watershed dwellers have also become more frequent. The lowland farmers of Chom Thong district in Chiang Mai province, for instance, have asked the government to move hilltribe people from the headwaters to the lowlands. Forced relocation of hilltribes, however, not only uproots traditional communities, but leads to political instability as well.

The growth of the industrial and service sectors has increased demand for water. Yet these very sectors release polluting wastes into waterways shared by various communities. The pollution of the Nam Pong River in Khon Kaen province in northeastern Thailand is a recent example. Two other examples from this same river were the leakage of a molasses tank from a sugar factory in 1992, and the alleged discharge of untreated waste by a pulp and paper factory in May 1993 into a natural reservoir. The public outcry, especially from the affected communities, led to the factory's closure for 36 days. Such issues are still far from solved.

The increasing number of golf courses sprouting up throughout the country has created widespread water use conflicts. It is estimated that Thailand now has several dozen golf courses, with a further 35 under construction. On average, each golf course occupies about 533 acres and consumes some 6,500 cubic

meters of water per day, or 2.37 million cubic meters per year. A paddy field the size of a standard golf course requires only 2.4 million cubic meters of water for an entire crop season. Golf courses are obviously highly water-intensive. When all Thai golf courses are completed, they will consume 476.9 million cubic meters of water per year. This is equivalent to half of the surface water used by the country's urban communities in 1991. And, because of their excessive use of fertilizers, golf courses are also alleged to pollute waterways.

Water quality is further threatened by population congestion in urban areas, especially greater Bangkok. As continuing migration from rural areas to urban centers triggers yet more rapid urban growth, public utilities have inevitably lagged behind the spiraling growth of urban population. Domestic sewage is now commonly discharged into waterways at such a high rate that the water in the Chao Phraya River, the nation's lifeline, has become unfit for domestic use. Since 1981, some species of fish have also disappeared. More will no doubt follow.

Air pollution

About 28 percent of the Thai population lives in cities. According to the official register, the country's principal city, Bangkok, houses at least 8.9 million people. In fact, each day more than 10 million people, or almost 20 percent of Thailand's population, work in the city. Bangkok alone accounts for 51 percent of the country's energy consumption for land transport. As roads are Bangkok's main means of transport, ever more heavy traffic is now in itself a major source of air pollution. The city now suffers dangerously high levels of lead, carbon monoxide, sulfur dioxide and other pollutants in the air its frustrated inhabitants breath.

Among the various atmospheric pollutants, lead is believed to be the most socially harmful. A USAID-sponsored study speculates that children exposed to lead in Bangkok for the first seven years of their lives may lose four or more points in their intelligence quotient.

The electricity sector is yet another major contributor to air pollution, as a substantial part of Thailand's electricity is generated using lignite, or "dirty" coal. During October 1992, airborne pollutants, mainly sulfur dioxide emitted from electricity generating plants in Mae Moh, Lampang, damaged the health of more than 1,000 people and caused crop failures and the death of untold domestic animals. To overcome this problem, fuel-gas desulfurizers, or "scrubbers," should be installed as soon as possible. This means substantial investment in capital costs. It would also increase electricity charges by 25 percent (*TDRI White Paper* No. 1, August 1992). As electricity is income-elastic, i.e., demand rises faster than income, domestic need is projected to grow at about 10 percent annually until the end of the Seventh Plan in 1996. In 1991, the energy sector contributed an estimated 36 percent of total national CO_2 emissions (TDRI/TEI 1993).

For the long term, reducing pollution caused by electricity generation requires an investigation into cleaner energy production alternatives and measures to make electricity use more efficient. And energy should be priced to include the costs of preventing environmental degradation.

Industrial Hazardous Waste

As Thailand is restructured further toward more manufacturing activities, the number of industries which produce hazardous waste continue to increase. From 1979 to 1989, for instance, these industries zoomed up from 29 to 58 percent of all factories in the industrial sector. Frequent industrial accidents invariably accompany the runaway type of industrialization which Thailand is currently pursuing. Chemical fires, lethal gas and dynamite explosions, gas leaks and other mishaps, as tragic as they are avoidable, are more and more frequently reported in the daily newspapers. All this suggests an "unfriendly" and out of control industrial environmental future. Small factories using chemicals, and sometimes even mixing chemicals whose properties are not clearly understood, are springing up everywhere. Their waste chemicals are then irresponsibly dumped into public waterways, all finally ending up in the Gulf of Thailand, the nation's most vital source of marine resources.

Yet the state's role here is quite clear. It must turn these present hazardous uncertainties into manageable risks. Monitoring agencies urgently need to have information systems as to who is using what, where, when, and how much. Obviously environment and development issues are becoming increasingly interwoven, even inseparable. To solve environmental problems thus requires inter-disciplinary knowledge and an understanding of the physical and social sciences, as well as of Thai culture and traditions.

CAUSES OF ENVIRONMENTAL DEGRADATION

Population growth and poverty are often cited as the root causes of environmental degradation. This observation is not wholly accurate. Case studies reveal that both the rich and the poor have helped devastate national forest resources. The root cause is the failure to ensure efficient and equitable allocation of these resources and to protect them for the nation's future. These can be termed market and/or policy failures.

Market failures

Generally speaking, the market provides an efficient means of allocating resources and pricing products. Prices in a competitive market normally reflect the true costs of products. Market mechanisms ensure that products in high demand are highly priced. But many resources, such as forest products and water, are not priced at a level which reflects their true cost. For these products, the market fails to become an efficient means for allocation. The property rights for forest, water and fisheries resources are ill-defined and difficult to enforce, leading to their over-extraction. Deforestation and the conflicts between highland and lowland farmers over water typify environmental degradation arising from common access and unclear ownership. In the absence of appropriate allocation, farmers and golf course owners—neither of whom pay for it—will continue to waste water.

Air pollution from traffic congestion, dumping of residential waste into public waterways and industrial pollution, are all examples of market failure. The abuses of polluters also adversely affect other individuals innocent of these environmental crimes. This phenomenon is known as an "externality problem." Moreover, when the number of polluters is high, it becomes increasingly difficult to identify individual culprits and to determine the damage caused by each.

Thus, when the market fails to function efficiently and if the problem is to be overcome, the government must step in. The government can, for instance, allocate the use of forest timber through concessions and provide property rights to farmers for land. The lack of clear property rights discourages long-term investment in land and encourages further encroachment on the forests. Governments can also set up sewage systems and treatment plants, and then force recalcitrant polluters to pay for the use of these facilities.

Government Failures

Ill-conceived government measures can themselves cause environmental degradation. Government failures are of four types (Panayotou 1993). First, government intervention unintentionally disrupts a well-functioning market. In the district of Tron in Uttaradit province, a local community invested in pumping river water for irrigation. The costs were shared according to the volume required for each crop. The government later imitated this system in other villages, but provided free water for all, thus destroying the previously efficient market system.

Second, governments fail to charge the full costs of environmental damage. An example is issuing forest concessions at unrealistic prices that fail to reflect forest replacement and externality costs. Electricity charges that exclude the cost of preventing environmental degradation or adverse public health effects are obvious illustrations of this second type of policy failure.

Third, government intervention aims to improve the market, but sometimes worsens it. Poor, early development of permanent agricultural sites is a good illustration. Traditionally, Thailand's hilltribes practice shifting cultivation: they clear and burn forests every year to open new land for cultivation. Once farmed

out, the farmers allow the land to reforest itself, both to regain fertility and to minimize erosion, thus guaranteeing long-term productivity. As land has become more scarce, development agencies have introduced the highlanders to cash crops and permanent agriculture, disrupting the traditional time-tested system. If permanent agriculture is not introduced with sound conservation practices, expansion of cash crop farming produces only temporary, non-sustainable development. Yield decline and runaway deforestation becomes both more widespread and more disastrous. Yet governments continue to pour scarce cash into just such "development" schemes.

Finally, governments ignore glaringly obvious market failures. This is clearly the case with water. The government allows all parties to take all the water they want free of charge until there is no water left and taps run dry.

It is true, of course, that environmental management is a delicate art. In some cases, the state should promote the market. In others, it should itself set the rules of the game and, while doing so, be careful neither to over- nor under-regulate the system, no easy accomplishment in any country.

THE NEED FOR INTEGRATED MANAGEMENT

Realizing the prohibitive costs of environmental degradation, government agencies are now trying, with mixed results, to protect the national environment. The logging ban, watershed protection, energy demand management scheme, subsidies for unleaded gasoline, and increased investment in waste treatment are all examples of government responses to environmental degradation. The Seventh National Economic and Social Development Plan (1992-1996), in particular, has endorsed the "Polluter Pays Principle." A most important breakthrough was the enactment of the highly-innovative Enhancement and Conservation of National Environmental Quality Act B.E. 2535 (1992). First, the Act attempts to manage environmental problems in an *integrated* way through an inter-disciplinary ministerial committee with both short- and long-term plans. Second, it delegates environmental management to the provincial authorities. Third, it recognizes and encourages the participation of non-governmental organizations (NGOs) and the people themselves in environmental protection. Fourth, the Environmental Fund has been set up to promote investment in pollution control and to translate the Polluter Pays Principle into actual practice.

Priorities for the near future should be as follow:

- Fair and equitable resolution of conflicts over natural resources among different social groups (i.e., hilltribes, farmers, industrialists, various government agencies, rural and urban consumers, etc.). Provenly valid economic instruments should be employed for allocating resources. Governments tend to ignore a problem until it becomes so socially and politically costly they have no choice but to intervene.
- The use of "stick-and-carrot" measures to encourage "good" industrial behavior in facing pollution and hazardous waste.
- Prevention rather than treatment measures must be designed.

Despite the extensive legal and administrative overhaul for environmental protection, current attempts are still limited to end-of-pipe treatment rather than prevention. The indispensable next step must be to institutionalize preventive measures. As the experience of the industrialized economies shows, treatment costs invariably far exceed prevention costs.

A number of barriers must be honestly faced:

- shortsightedness and the unwillingness to hold discussions between the government and the various interest groups, as well as among the interest groups themselves
- lack of awareness and incomplete information regarding current industrial practices and potential environmental hazards and disasters
- ineffectiveness and indecisiveness of the government administration.

By correcting such inadequacies, Thailand can save its own environment and also contribute to moving the

world toward a brighter, healthier and more sustainable future.

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