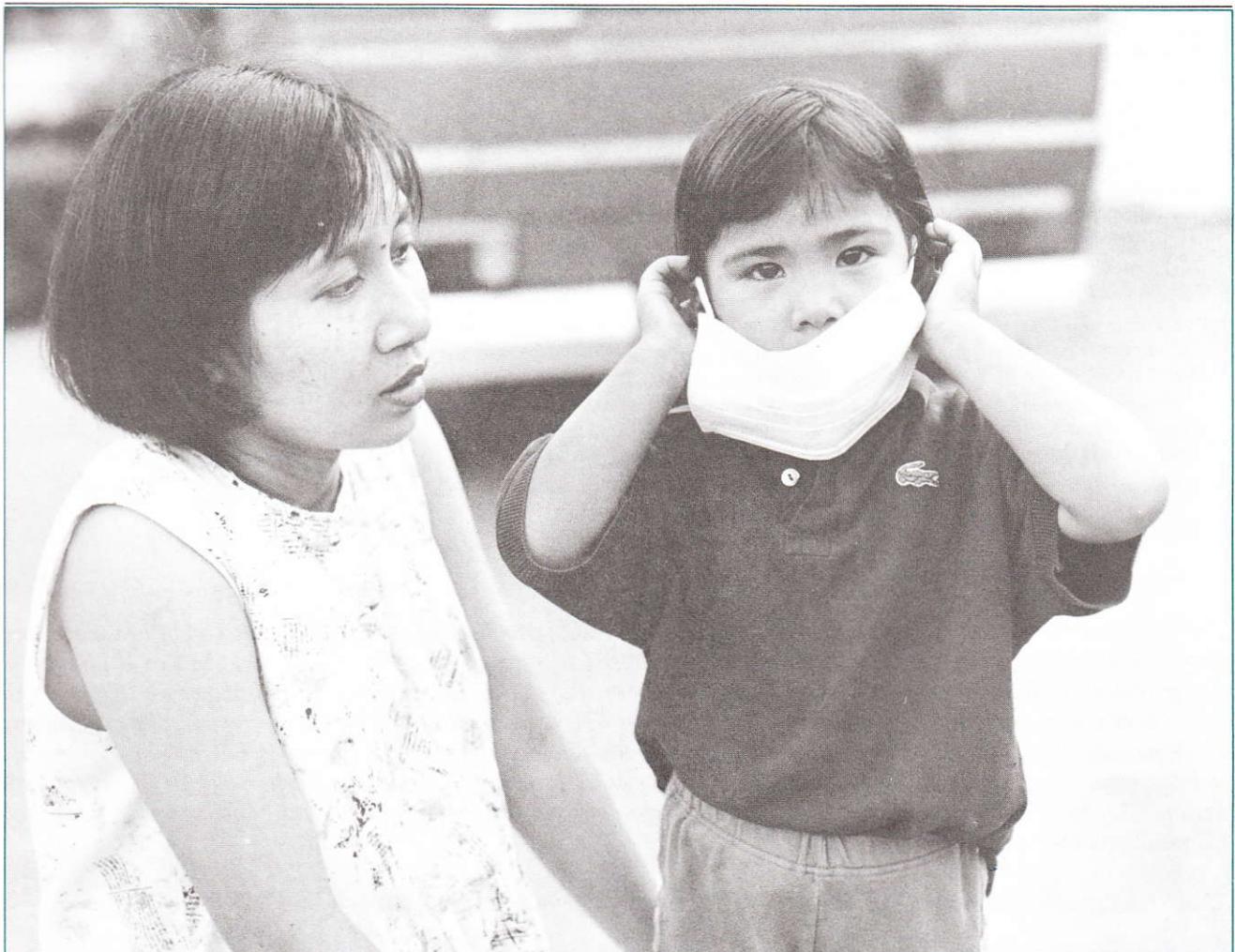


# TDRI

Quarterly  
Review

## Contents

The TDRI 1993 Year-End Conference “Who Gets What and How?: Challenges for the Future”	3
Global and Regional Economic Change: Implications for Northern Thailand <i>by Frank Flatters and Mingsarn Santikarn Kaosa-ard</i>	8
Enforcing Environmental Quality: Why Trade Policy Isn't the Answer <i>by Maureen Grewe</i>	16
Lead Poisoning – A Severe Threat to the Nation's Health <i>by Suwanna Ruangchanasetr and Chamaiphan Santikarn</i>	21
TDRI INFOSHEET: Thailand's Drought Crisis	28
NEWSBRIEF	30



*A flimsy, ill-fitting mask affords little, if any, protection against the devastating effects of lead poisoning (see related article on page 21).*

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*The Thailand Development Research Institute Foundation was established in 1984 to conduct policy research and disseminate results to the public and private sectors. TDRI was conceived, created and registered as a non-profit, non-governmental foundation, and is recognized as such by the Royal Thai Government. The Institute does technical and policy analyses to support the formulation of policies with long-term implications for sustaining social and economic development. TDRI has six research programs: Human Resources and Social Development, International Economic Relations, Macroeconomic Policy, Natural Resources and Environment, Science and Technology Development, and Sectoral Economics; and two special research projects: "Thailand in the Year 2010" and "Thailand and Economic Cooperation in the Asia-Pacific Region."*

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## The TDRI 1993 Year-End Conference

### “Who Gets What and How?: Challenges for the Future”

Over the past two decades, rapid industrialization has transformed the organization of Thai society and the way in which it allocates and uses resources. New groups have now emerged to compete for access to scarce resources. As the income gap between the urban and rural sectors widens, governance becomes more complex, and solutions to inequity problems more urgent.

To address these problems, the Chai Pattana Foundation and TDRI selected the theme “Who Gets What and How?: Challenges for the Future” for the 1993 Year-End Conference. Part of the research was from TDRI’s long-term study on “Thailand in the Year 2010,” which began in 1991.

The 1993 Year-End Conference was different from previous Year-End Conferences: for the first time, TDRI brought together research institutes throughout the country to collaborate in this major, country-wide study. Specialists from Chulalongkorn University’s Social Research Institute, Chiang Mai University’s Social Research Institute, and Khon Kaen University’s Research and Development Institute assisted in data collection and policy analysis of past and current economic trends in their respective regions.

Papers presented at the Conference included “Urban Life and Urban People in Transition,” “Democracy Without Equity?: The Institutions and Political Consequences of Bangkok-based Development,” “Social Inequality: A Source of Conflict in the Future?” “Beyond Patronage: Tasks for the Thai State,” “Community Integration into Regional Industrial Development: A Case Study of Klong Ban Pho,

Chachoengsao,” “The Making of Modern Bangkok: State, Market and People in the Shaping of the Thai Metropolis,” and “Socio-Cultural Change and Political Development in Central Thailand, 1950-1990.”

Held from December 10-11, 1993 at the Ambassador City Jomtien, Chon Buri, the Conference was attended by 400 participants from government and non-governmental organizations, the private sector, academia, international organizations and the media. Participants were indeed gratified and honored by the presence of Her Royal Highness Princess Maha Chakri Sirindhorn, who graciously presided over the Opening and Closing Ceremonies.

In her opening address, Her Royal Highness said:

*“The analysis of what we have lost in achieving economic and industrial progress is indeed an admirable exercise. In the midst of our newly-acquired prosperity and rapid social change, we have neglected to account for the things we have had to give up, especially some aspects of our precious cultural tradition and other desirable aspects of Thai society.*

*But this is not to give the illusion that everything related to the past is desirable, and that we should swim against the current to bring it back. Instead, what we should attempt to achieve at this Conference is to seek ways to minimize the costs of progress and to create a more balanced, equitable and peaceful society in the future.”*

*Her Royal Highness Princess Maha Chakri Sirindhorn graciously accepts a set of Conference papers from Dr. Ammar Siamwalla, President of TDRI.*



## Summary of the Synthesis of Research Findings

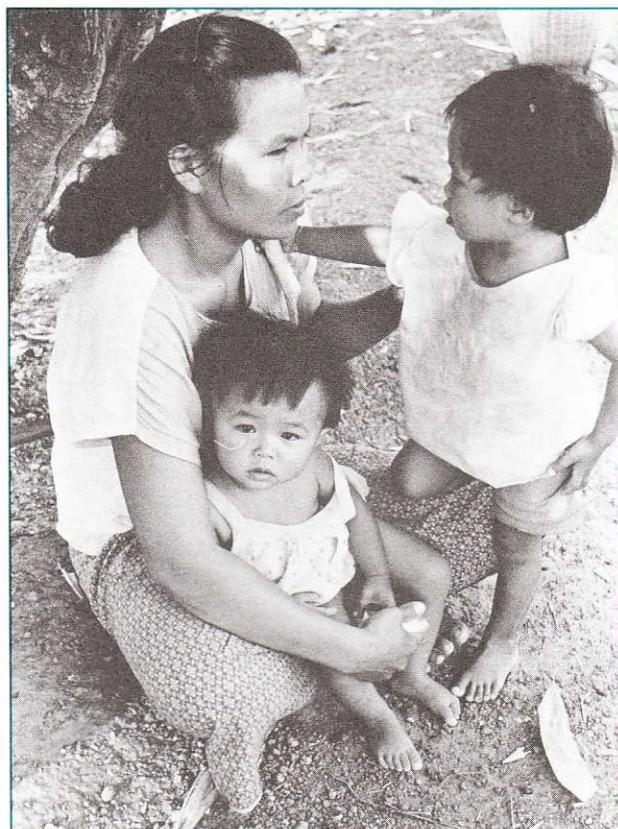
# “Who Gets What and How?: Challenges for the Future”

**T**hailand’s transformation from an agrarian to an industrial and services-based economy has helped to generate great changes in the political system, in social institutions, and in cultural values. As the institutions of agrarian society break down or become outdated, the means for assigning rights to the use of resources, for providing public goods, and for allocating resources are transformed as well.

The Conference focused on two consequences of these changes. The first is that industrialization may have undesirable, even pernicious, effects on the social and cultural fabric of society through such consequences as the breakdown of the family, the lack of security for laborers and urban migrants and, more broadly, the lack of an equitable distribution of national wealth and income. Several of the papers presented at the Conference documented these consequences through a combination of quantitative and qualitative data and case studies.

Second, a market-oriented, increasingly urban and industrial society requires institutions and forms of governance that often differ vastly from those of the older, agrarian social order. Industrialization is a process that requires delicate institution-building throughout the public and private sectors to address many of the negative consequences cited in the papers, to correct market failures, and to provide necessary public goods. The state becomes an important player in development: it must assume new functions to not only promote industrialization, but also to sustain it and help ensure that its fruits are distributed equitably. At the same time, new occupational groups and interest associations compete for influence over government policy, putting often contradictory pressures on the machinery of government.

Both of these consequences are well apparent with regard to the political, social, and cultural aspects of Thailand’s rapid economic development. Session I addressed these consequences and suggested what future trends loom ahead, given continued industrialization amidst a declining natural resource base and increasing competition with other industrializing countries. Session II then addressed the implications of Session I for economic and social policies. Session III followed with a critical discussion of the legal and institutional tasks



*The Thai State has done a relatively poor job of ensuring that growth is distributed equitably to the rural poor.*

which should be undertaken to make the political system more capable of promoting sustainable industrialization, with improved equity and sectoral balance.

### Session I: WHO GETS WHAT AND HOW?

Synthesis Report Volume I, entitled “On the Road to the Future,” focuses primarily on the consequences of industrialization for farm labor and income distribution in the agricultural sector. With the depletion of natural resources, a shift from labor-intensive agriculture to capital-intensive farming is sure to accelerate. Although

large-scale farming and agribusiness provide new employment opportunities in the countryside, without secure land titles and effective public agricultural services, small farmers could fall behind. Equity imbalances between large-scale farmers and small, less productive farmers would result.

So long as the industrial and services sectors can absorb the surplus labor from the countryside, then there are options for the rural poor. But should urban wages be held down in the face of trade competition, there is potential for the development of rural "slums" with increasingly discontent, underemployed, and impoverished farm workers.

The second Synthesis Report, on changes in Bangkok, focuses on the rise and consequences of a new individualism in Thai urban society. The role of family and religious institutions in Bangkok have undergone great change, and no longer act as the fundamental bonds linking people and communities together. As Bangkok becomes an ever huger megopolis, the traditional communal and familial methods of addressing problems such as poverty and ageing have declined, but it is hardly clear whether the "new individualism" of the urban Thai can provide any equivalent buffer.

Synthesis Paper III, entitled "Democracy without Equity," analyzes the political consequences of "Bangkok-based development," suggesting that parliamentary institutions in Thailand are often unable to address structural and equity imbalances between the urban and rural sectors.

In the paper, it is argued that there is very little correlation between the existence of electoral democracy and the improvement of equity in the economy. While democracy has created more channels for the participation of voters and interest groups in national policy making, the parliamentary system in Thailand has not proved successful at yielding policies which could address the collective needs of the society

and, in particular, the collective interests of the rural majority.

Instead, parliamentary democracy in Thailand constitutes a "distributive game" in which elected politicians use public policy to allocate benefits to the financiers and voters who support their particular political machines. The policies of elected governments thus tend to be inconsistent and ad hoc, as the politicians attempt to please the two primary groups which sweep them to power—the business elites of Bangkok, and the rural voting majority. Members of these two groups desire vastly different kinds of outputs from elected governments.

The final Synthesis Paper addresses the breakdown of community institutions in the countryside and the social consequences of increasing inequities in the Thai economy. Over the past century, the expansion of the central state administration in the provinces, and increasing industrialization, have diminished the roles of village leaders and extended families in providing welfare, security, and mechanisms of local governance at the village level.

While this in itself is not inherently an undesirable outcome, the trend begs the question of what institutions have arisen in their place to perform certain welfare and conflict management functions, as the natural resource base declines amid increasing population growth. Without the development of effective institutions and forms of governance to address inequity problems, social conflicts could increase in the future should the older institutional fabric of Thai society be totally dismantled.

This question is important not only to the countryside, but to new occupational groups, such as urban labor, as well. Currently there are few legal or political mechanisms for addressing the emerging problems for laborers, for example, their welfare, health care, and safety on the job. Thailand is in dire need of

*As extended families are dismantled by industrial growth, policymakers must address the welfare needs of the elderly.*



**Table 1** Income Shares by Quintile Group, 1981-1990

Quintile	Shares in 1981	Shares in 1988	Shares in 1990
Lowest 20%	5.41	4.50	4.05
Second 20%	9.10	8.09	7.43
Third 20%	13.38	12.27	11.92
Fourth 20%	20.64	20.26	20.11
Top 20%	51.47	54.88	56.48

Source: National Statistics Office, Socio-economic Household Surveys, 1988 and 1990.

institutions and laws to address these emergent problems.

### Session II: IMPLICATIONS FOR SOCIAL AND ECONOMIC POLICIES

In the paper on the implications of the research findings for social policy, it is argued that the key to devising a successful and equitable set of social policies in the future will lie in the state reducing its power and authority. All countries that have succeeded in addressing social issues have seen their governments provide a measure of autonomy for communities and professionals to define social policy priorities and set social policy standards.

Yet, at the same time, the state must play a role. For the Thai state to play a constructive role, however, it will need to undertake some serious reforms. It must not seek power only, but must be able to intelligently define social policy priorities and then see these priorities through to the promulgation of effective laws and measures.

The paper on economic policy and public finance focuses on the implications of the increasing globalization of the Thai economy for future economic conditions and policies. In the paper, the author suggests that the Thai economy is a bit too open to the world economy. Because Thailand lacks an effective state, which can identify policy priorities in sectoral policy areas, and, because of liberalization measures leading to more open financial transactions, Thailand could witness "foot-loose" investment which could work to the disadvantage of the poor and weaker sectors in the economy.

Globalization could lead to a high degree of vulnerability and Thailand could become unduly open to the consequences of economic developments in the rich, industrialized countries. Moreover, the command of technology by the rich countries, and the possibility of increasing protectionism, could have undesirable effects on the Thai economy. As an alternative, the paper suggests a policy of environmentally-friendly "sustainable" development, combined with social welfare provision and some curbs on the freedom of capital to

flow in and out of the country. This would constitute a "middle" path between the extremes of unqualified liberalism and the self-sufficiency approach often touted by non-governmental organizations.

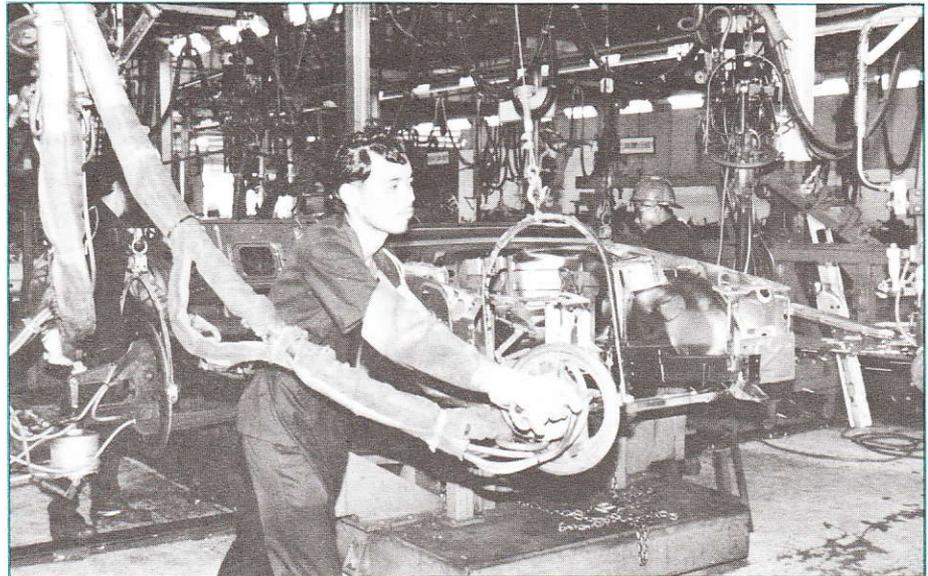
Some of the points of the development strategy of the future emphasized in this paper were:

- provide welfare support for the rural and urban poor, the elderly, and the mentally handicapped
- provide "adjustment assistance" for sectors with bleak futures, such as rice and tapioca
- abolish Board of Investment promotional privileges, crop price interventions and support schemes in the present form, and export "packing credits," so that government finance could be freed up for improving the welfare of the poor and disadvantaged
- return ownership over local resources to communities
- alter the economic policy-making institutions so that they are more transparent and amenable to public participation (through means such as public hearings and the provision of more open public information)
- decentralize many government functions now monopolized by the central administration

### Session III: TOWARD GOOD GOVERNMENT

The first paper, on law and the judicial process, identifies inequities in the policy-making process which are rooted in the system of administrative law in Thailand. In the paper, the author argues that the law often favors the manufacturing sector over the agricultural, by allowing for such measures as the taxation of agricultural exports and high tariffs on industrial imports. The law also often favors particular interest groups over the public at large because it is very vulnerable to being "captured" by those with power and connections to officialdom. Pressures associated with

*As Thailand continues to urbanize, we can expect workers to form stronger unions.*



globalization increasingly clash with these interest groups, as illustrated by recent conflicts over intellectual property protection and demands by the industrialized countries for freer trade.

In the future there will be an increasing need for legal reform. Currently, the law is used to promote the interests of either the state or of powerful interest groups. Vast discretion is given to public officials by the system of subordinate legislations at officials' disposal. What is needed, however, is a form of law that balances the interests of the public at large against national interests more generally. The law should not only be an instrument for policymakers to utilize at will, but it should function as a mechanism to limit the discretion of policymakers. The law should also be used to promote the number and scope of formal interest groups (such as trade associations) to include associations formed by farmers, the poor, and non-governmental organizations.

Procedures and an institutional framework for public hearings should be developed, whereby all concerned parties are able to present their views before any legislation or executive regulations are passed or amended. Such requirements would reduce the uneven influence exerted by powerful interest groups and cartels over certain policy issues. This role for law should be developed so that Thai society would progress with a proper balance between interest groups and less privileged citizens.

In the final paper, on the role of the Thai state in the coming decades, the authors argue that the political system will continue its shift away from the "administrative-centered government" of the past to an increasingly interest-group centered government. Several problems of governance have arisen during this transition, however, which are likely to become more pronounced in the future. The problems center on the fundamental shortcoming that the state has been failing to provide the goods and services that are necessary for managing the

increasing complexities of an urban, industrialized society.

Many of the services the state will increasingly need to provide are heavily knowledge-intensive and require great administrative and technological agility. However, the old practices associated with administrative-centered government, whereby officials implement policies and allocate patronage in a top-down fashion, are unsuitable for governing a complex economy. The older, top-down approach can be seen in official policies ranging from agricultural extension to irrigation management, and from public safety to public infrastructure projects. Many of the problems and deficiencies with public policy in these areas arise because the state is often unable to conduct information management in an intelligent fashion or perform monitoring and feedback effectively.

The difficulties the state faces in meeting the tasks of a complex economy are compounded by the fact that urban and rural voters demand qualitatively different kinds of outputs from government. While urban dwellers—primarily business elites and the middle classes—want a government that can perform these knowledge-intensive tasks well, the average rural voters are more satisfied with the kinds of policies and resource distributions associated with the patronage practices of top-down government.

In the future, permutations of five key variables will determine how effectively the state is able to govern:

- the international economic environment (whether it is strong and open to trade, or whether growth weakens and trade contracts)
- the political roles of the urban middle classes
- the political roles of urban labor
- the unity and political roles of the military
- the extent of civil service reform/restructuring

# Global and Regional Economic Change: Implications for Northern Thailand

Frank Flatters\*  
Mingsarn Santikarn Kaosa-ard\*\*

*This article is based on a background report for a TDRI/Chiang Mai University investment plan study being undertaken for Chiang Rai province. The purpose of the background report is to place Chiang Rai's plans in a global and regional context.*

*The article is divided into two main sections. The first places Chiang Rai province in the context of the rapid growth of Thailand and other countries in this region. It emphasizes the importance of international trade and investment in this process and discusses the nature of recent developments in international and regional trading arrangements. The second major section focuses on the economic changes occurring in the "golden quadrangle," which connects Northern Thailand with Lao, Burma and Southern China, and the implications for Northern Thailand. It examines some of the reasons for these changes, and looks at the effects of economic liberalization in Southern China and improvements in transportation infrastructure within this region. It then examines some of the resulting opportunities for and threats to Northern Thailand, and concludes by looking at some particular policy issues.*

*A general conclusion is that the pace of the economic changes that will occur in Northern Thailand as a result of these developments is easily overestimated. One should not be excessively optimistic about the net benefits for Northern Thailand.*

## THAILAND IN THE CONTEXT OF GLOBAL ECONOMIC CHANGE

Recent decades have witnessed unprecedented global economic change. The countries of East and Southeast Asia have been at the forefront, and Thailand has been one of the leaders of this group. The changes involve a number of features which are common, to a lesser or greater extent, to all of these economies: 1) very rapid economic growth, 2) major shifts in economic structure—in most cases from agriculture to industry, and a continuing change in the structure of industry itself, 3) high rates of technical change, based largely on imports and adaptation of foreign technologies, 4) high levels of foreign and domestic investment, and 5) rapidly growing international trade, led by increasingly competitive exports of manufactured goods and imports of necessary capital and intermediate inputs.

The rapidly growing economies of East and Southeast Asia<sup>1</sup> have expanded over the past several decades at rates considerably greater than the advanced western industrial countries, and far in excess of most other parts of the developing world. As recently summarized by the World Bank:

"Since 1960, [these economies] have grown more than twice as fast as the rest of East Asia, roughly three times as fast as Latin America and South Asia, and five times faster than Sub-Saharan Africa. They also significantly outperformed the industrial economies and the oil-rich Middle East-North Africa region" (World Bank, 1993, p.2).

Thailand has been one of the leaders, even within this highly competitive group of economies.

The growth of this region of the world has occurred in several stages.<sup>2</sup> The first of these countries to experience rapid industrial growth was Japan, followed by Hong Kong, Korea, Singapore and Taiwan. While the experiences of the latter four economies differed considerably, they all followed Japan's achievement of rapid industrialization and extremely competitive export performance. This strong export performance began with specialization in relatively simple, labor-intensive technologies (textiles, footwear, assembly of consumer electronics, etc.). The success of this process, however, brought with it a need for further changes. Labor shortages arising from increasing demands in the growing industrial and urban service sectors, increasing

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accumulations of capital, and general human resource development which increased the skills of the labor force, caused these countries to lose their competitive advantage in simple labor-intensive products and, at the same time, to become more competitive in more capital and skill-intensive activities. The major changes were induced most immediately by the appreciation of the Japanese yen in the 1980s. While the currencies of the "tigers" tended to follow the yen up against the dollar and other major currencies, most of the Southeast Asian currencies stayed more closely aligned with the dollar.

An important corollary of these changes in the four "tigers," therefore, was a shift in production of some of the simple, labor-intensive activities to other countries whose economic environment made them receptive to the investments and technologies that would permit them to climb the industrial ladder at the heels of these tigers. The countries best placed to take advantage of these opportunities turned out to be Malaysia, Thailand, Indonesia and, more recently, China. In addition to the standard prerequisites of sound macroeconomic management and a relatively healthy and well-educated labor force, Thailand's success depended on: 1) the growing surplus of labor being made available as a result of declining opportunities for opening up of new agricultural land, and 2) economic policies which were open to foreign investors and which were becoming more open to international competition (by lowering barriers against imports), and increasingly supportive of exports (by providing incentives and various forms of compensatory policies to at least partially offset the penalties imposed on exporters by policy-induced import barriers).

Export incentives in Thailand have been of a number of types, and have included special income tax concessions in the form of tax holidays and provision of financial credits for financing of exports. In the absence of offsetting measures, one of the greatest barriers to manufactured products' export growth is high costs of capital and intermediate goods inputs due to tariff and non-tariff restrictions on imports. Import protection impedes exports both directly, by raising the cost of tradable inputs, and indirectly by causing the equilibrium exchange rate to be higher than it otherwise would be, hence making it more difficult for domestic producers to be competitive in world markets. The general liberalization of imports that Thailand has implemented over the past decade has tackled this problem directly. Indirect measures have included the setting up of export processing zones, which are exempt from normal import restrictions and taxes, and the implementation of duty exemption and rebate schemes for exporters. Thailand has relied less than some other countries in this region (especially Malaysia) on export processing zones, and has concentrated instead on the second type of measure, which, in effect, makes any qualifying export producer's factory the equivalent of an export

processing zone. This is a much more flexible form of relief for exporters.

Export-driven growth has also depended on general openness and growth of world trade. It is especially and obviously important for an exporting country to have access to foreign markets. This can sometimes be important as well with respect to availability of critical raw materials and/or intermediate and capital inputs. A country's export industries can be adversely affected if an important supplier of raw materials erects barriers to their export (often to protect their own downstream processing industries) and hence deprives downstream exporters in other countries of access to the raw materials. Similarly, improvements in communication and transportation links with a hitherto remote and isolated foreign supplier of raw materials can make new sources of these materials available to countries affected by the improved transport links.

Thailand's access to export markets has relied to varying degrees on three features of world trade. The first has been the general growth of these markets over recent decades. The overall growth slowdown that has occurred in developed countries in recent years, fortunately, has had little impact on Thailand's export growth. Apparently Thailand's increasing competitiveness has offset any harmful effects of the world market slump. It is unclear, however, how long Thailand would be able to sustain its export growth if this slump continues. And it is also unclear how long Thailand will be able to maintain its position in the face of rising competition from the next wave of industrializing countries, especially countries like Vietnam and, of course, China.

The second important feature of world trade has been the success of the multilateral GATT trading system, which sets out "rules of the game" for all member countries, and is intended to maintain open, non-discriminatory world trade. Other than certain types of permitted regional trading arrangements, to which we turn in a moment below, the principal forms of discrimination that are allowed under the GATT are for the benefit of developing countries. First, the Generalized System of Preferences (GSP) permits advanced countries to provide preferential tariff reductions to developing countries. Thailand has derived some benefits from GSP. Second, developing countries have been subject to far less pressure than advanced countries to reduce barriers to imports into their own countries.

The multilateral GATT system has been subjected to increasing pressures recently. The long delays in obtaining agreement on the Uruguay Round of GATT negotiations were one indication of this. The main difficulties here were on broadening the coverage of GATT to include trade in services, protection of intellectual property, and especially freer trade in agriculture. Although developing countries have a relatively large stake in the latter issue, the real battle was between the U.S. on one hand and the European Union (especially

France) and Japan on the other. Increasing use of unilateral trade actions to solve trade and even broader diplomatic disputes has been another source of friction in the multilateral trading system. The use, or the threat, of anti-dumping and countervailing duties, primarily by advanced countries, against imports from both advanced and developing countries has been seen as a threat to an open multilateral system.

The third important feature of world trade in recent years has been the emergence of a number of different forms of regional trading arrangements. These usually involve the general or selective reduction and/or removal of formal trade barriers (tariffs, non-tariff barriers, etc.) among member countries, while maintaining (common or separate) trade barriers against imports from non-member countries. They also generally include investment-related measures and attempts to reduce discrepancies among member countries in economic regulation and taxation. Whenever a group of countries forms such a regional trade grouping, a concern of non-members is that there will be trade diversion, whereby a non-member country's exports to the bloc will be displaced by products from member countries. On the other hand, higher growth rates and/or changing economic structures within the bloc might increase demand for exports of some non-members. From Thailand's perspective, the two most important regional blocs in the rest of the world are the European Union (EU) and the North American Free Trade Arrangement (NAFTA), which recently expanded the Canada-U.S. Free Trade Area to include Mexico.

For a number of reasons, some of which are responses to threats from the formation of other regional trade blocs in the rest of the world, Thailand has become engaged in trade blocs of different types in this region. By far the most important formal arrangement is the ASEAN Free Trade Agreement (AFTA), under which the ASEAN countries have agreed to a scheduled reduction in tariffs on trade among themselves. As existing tariff levels of most ASEAN countries are still relatively high, the benefits of these preferential reductions could be significant. However, these benefits are likely to be reduced by: 1) tendencies of member countries to seek exclusions from tariff reductions whenever domestic industries are seen to be threatened, and 2) the considerable similarities in economic structures of many of the member countries, and the focus of their export activities on markets of non-ASEAN countries.

The second type of regional trading arrangement with which Thailand has become involved has been more informal and often more market driven. These arrangements have generally emerged as a response to particular needs among the countries concerned, or even their sub-regions, and often involve only a selected number of economic sectors or activities. In the case of Thailand, the growth triangle involving Sumatra, North Malaysia and Southern Thailand, and the "golden

quadrangle," including Burma, Southern China, Northern Thailand and parts of Indochina, are the two most important examples. However, there also have been specific sectoral measures involving trade and investment allocations in the automotive sector among a number of regional economies, for example. The purpose of these arrangements has been to reduce or eliminate particular trade and investment barriers that seem to stand in the way of some obvious potential mutual gains from trade.

### THE "GOLDEN QUADRANGLE" AND IMPLICATIONS FOR NORTHERN THAILAND

In light of the rapidly changing global context, the countries involved in the "golden quadrangle" area bordering and/or close to Northern Thailand can be thought of either as a threat or an opportunity to Thailand. These countries have many resources which, if available to Thailand, could be used to great advantage. The mineral, forest and agricultural resources of all of the nearby countries are rich and diversified. In view of Thailand's rapidly diminishing resources, especially when measured on a per capita basis, this seems like a very attractive source of supply. There is also a potentially very large labor force in these countries, whose wages are considerably lower than in Thailand. For Thai investors able to capitalize on this labor force availability, this might represent an opportunity to remain competitive in simple labor-intensive activities, in which rising domestic wages and emerging labor shortages are beginning to cause problems.

Finally, the sheer magnitude of the populations in these countries, especially in Southern China, combined with their rapid rates of income growth, creates the potential attraction of a large and expanding market for Thai products. Yunnan province alone has a population of close to 40 million persons, and Sichuan province, its neighbor to the north, has a population of about 110 million. For a number of reasons, including especially the rapid liberalization of economic activity in China, these provinces have been growing at rates far in excess of Thailand in recent years. From 1985 to 1991, for instance, Yunnan was the third most rapidly growing province in all of China, with an average annual income growth rate exceeding that of Guangdong province.<sup>3</sup>

The flip sides of all these apparent opportunities, however, are a number of potential threats to the Thai economy. Because of declining domestic availability of raw materials, resource-based industries in Thailand might find it increasingly difficult to compete with similar industries in the other resource-rich countries of the golden quadrangle. And labor-intensive industries in Thailand are likely to face increasing problems competing with similar industries that develop in the poorer economies bordering Northern Thailand.

The opportunities and threats discussed here are becoming more immediate with the rapid easing of trade and communication among the countries of the golden quadrangle. The two most important sources of improved communication at the present time are: 1) the liberalization of the Chinese economy and its opening up to private enterprise and international trade, and 2) the rapid upgrading of transportation linkages within the region. There are some similar indications of liberalization and opening up of the economies of Laos and Burma. While also significant, these changes are more tentative and certainly not on the same scale of importance as the changes taking place in China.

### China Looks Increasingly Outward

The liberalization of the Chinese economy has led in recent years to economic growth and structural transformation that is outpacing the performance even of the World Bank's eight "miracle" economies of East Asia. A great deal of the world's attention in observing this phenomenon has been focussed on the coastal regions of China. As indicated earlier, however, the southern province of Yunnan has also been sharing in this growth. Yunnan has great natural wealth, which it has been exploiting by extracting minerals, expanding agricultural activity and developing its vast potential for nature-based tourism.

In the case of agriculture, for instance, the autonomous prefecture of Xisuangbanna in the southern part of Yunnan province has over 1.8 million mu (120,000 hectares) planted in rubber, of which almost 350,000 mu (approximately 24,000 hectares) is in private plantations which were planted over the past decade. Xisuangbanna alone accounts for about one-third of total Chinese rubber production. Tobacco is an even more important crop for Yunnan, and accounts for about 60 percent of provincial government revenues. Many other cash crops are produced throughout the climatically varied province. Research being carried out in scientific institutes in the province is generating new bio-chemical products with potential commercial value, based on the abundant biological resources of the province.

Because of its climate and natural beauty and diversity, Yunnan has been a favorite destination for Chinese tourists. But with liberalization and opening up of the region to foreign travel, it is now becoming an international tourist destination. Estimates vary, and are hard to verify. But claims about the annual numbers of tourists visiting Yunnan often exceed 3 million. Xisuangbanna alone is estimated by some to receive over one million tourists per year. Government officials in that prefecture estimate that tourism accounts for about 20 percent of the total income of Xisuangbanna. Most of the tourist traffic to date seems to comprise (relatively low spending) Chinese tourists and a relatively small number of

low budget foreigners. The infrastructure for higher budget foreign tourists is still rather meagre, especially in Xisuangbanna and other areas outside of Kunming, although there is some evidence of increased activity in this area. At least one three or four star hotel complex is now under construction in Jinghong, the capital of Xisuangbanna prefecture, and a group of Thai investors is in the process of forming a joint venture to manage the only other "up-market" tourist hotel there. Kunming has a number of first class hotels, and a recently completed major convention center.<sup>4</sup>

The combination of natural resource availability and a large, generally well-trained labor force, also makes Yunnan a natural location for many types of industrial investments. Kunming factories produce considerable amounts of steel and steel products, cement and machinery. Many of these products are shipped to other parts of China, and are exported through coastal ports to other parts of the world. The same is true of textile products. "High tech" industrial parks are now being set up in Kunming for the assembly and manufacture of electronic products. Some machinery and textiles are already being exported from this region to Thailand, despite rather poor transportation infrastructure.

Although data are hard to find, it is apparent that there is considerable domestic and foreign investment in Yunnan. Sources of investment include provincial state enterprises and foreign investors, especially from Hong Kong, Singapore and Taiwan, but also from Thailand and other countries. With the opening of the economy to the influence of market forces, entrepreneurial activity is evident throughout the regional economy. And macro and microeconomic reforms continue to occur. At the beginning of this year, the two-currency system for foreign exchange dealings was reformed, with "foreign exchange certificates" abolished and unified with the domestic currency, or renminbi. The renminbi can now be exchanged for foreign currency at a unified rate, with few restrictions on the identity of the purchaser or the purpose for which the funds are intended. The net effects of this reform were to: 1) liberalize access to foreign exchange,<sup>5</sup> and 2) cause a sharp devaluation of the renminbi relative to foreign currencies. Both of these effects will serve to make Chinese producers, and domestic and foreign investors even more outward looking than they have been in the recent past.

### Improvements in Communication and Transportation

Among the other significant changes occurring in Southern China and the bordering countries in the golden quadrangle are improvements in transportation links. One of the main reasons for the isolation of Yunnan province, and especially its southern regions, within China and within the region of the golden quadrangle, has been the absence of a well developed transportation infrastructure. The whole area comprises largely of very

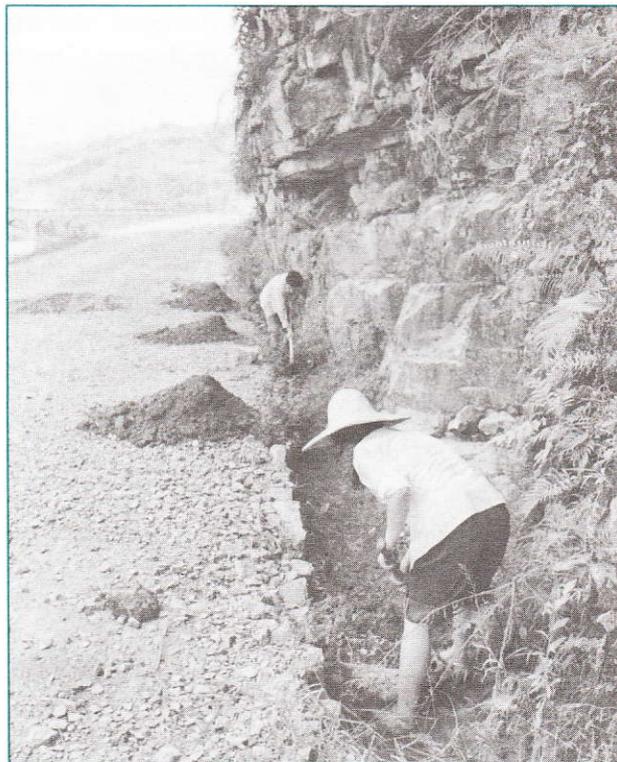
rugged mountainous terrain, punctuated by rivers whose flows are seasonably variable and whose courses are also very rugged in places. Kunming is connected by rail to the rest of China, although journeys are long, and there is often congestion and hence delays and uncertainties in freight service. There are at the moment no rail links to the areas south of Kunming, although there are plans to soon complete an extension of the railway to Simao.

Air links between Kunming and the rest of China seem to be quite good, and this is a major vehicle for tourist and “convention” traffic. Air transport, however, is not very relevant for many of the staple industrial and agricultural goods produced in the region. Jinghong also has a good airport, but there are still very few flights, most of which seem to go to Kunming. Thai International now operates a daily flight between Kunming and Chiang Mai and/or Bangkok. There is some talk of developing direct flights between Xisuangbanna and Northern Thailand, but no firm plans have yet developed.<sup>6</sup>

Besides air, it is also possible for goods and passengers to travel between the southern part of Yunnan by boat, along the Mekong River. The river is navigable from Simao to Chiang Rai, passing through Lao en route. During the wet season (about seven months long) boats of up to 150 tons can pass along this route; but during the dry season, the carrying capacity is reduced considerably. There is not much regular service on this route, partly for navigation reasons, and partly because of bureaucratic obstacles in regularizing the service through Lao territory. A consortium of Thai investors, however, is in the final stages of introducing regular passenger service, on a fleet of six boats, between Xisuangbanna and Chiang Rai. Agreements apparently have been reached with high level Lao officials regarding terms of passage of these boats through Lao.

The most impressive transportation infrastructure development at the moment involves the improvement of road links within the golden quadrangle region, and especially the establishment of high quality, all season highways linking Yunnan with Thailand, through Burma and Lao. At the moment there are eight different possible road links of this sort – six through Burma and two through Lao. The province of Yunnan has already made substantial investments in improving these road networks within China. Several of the roads from Jinghong to the Burmese and Lao borders are already fully-paved two-lane highways. According to one government official in Yunnan, there are plans to upgrade at least one of these roads to four lanes by the end of the century.

There are several apparent problems with the road links, however. First, even the roads that are already completed are relatively narrow; and because of the geography of the region, they are winding, tortuous routes, with many steep grades. They are very far from the sorts of highways one would think of as being adequate to carry large volumes of bulky and weighty



*Yunnan province has already made substantial investments in improving road networks within China.*

primary and industrial products. Second, the crucial links with Thailand through Burma and Lao are not yet nearly as well developed as those in China. There appears to be considerable confusion, if not mismanagement, in the development of these parts of the network. One hears stories of a number of stalled and/or aborted ventures to build such highways, at least some of them involving Thai investors.

The second major problem with road links is the bureaucratic obstacles involved in passing across borders and through local “fiefdoms” in Lao and Burma. Motor vehicles and their passengers and contents are subject to numerous checks and tolls as they pass through these areas. In some cases, these are administered by official subregional and central government agencies and, in others, by unofficial alternative governments. The locations, frequencies and charges and other demands imposed at these “toll booths” are variable and uncertain, which adds even more to their costs. These kinds of bureaucratic obstacles apply to greater or lesser extent to other forms of traffic as well. As already mentioned, boat traffic through Lao is subject to high and somewhat unpredictable charges. And occasionally boats are delayed for periods of up to 24 hours at check points in Lao. This significantly diminishes the attractiveness of this route for passenger traffic (for all but the true “adventure travellers”).

Visa and other types of immigration requirements form another important obstacle to movement of

people, especially tourists and, to a much greater extent, workers. Thailand and, increasingly, China are relatively open to tourist traffic. Burma and Lao are becoming more open to tourism, more so to citizens of the immediate region than to travellers from further afield. But many obstacles remain in these two countries. China remains very restrictive with respect to granting permission to its own citizens to travel abroad. The recent freeing up of the foreign exchange market should help to remove one obstacle. But long delays and relatively high costs involved in obtaining passports for foreign travel continue to seriously impede outgoing tourism from that country. Interestingly, relatively onerous financial guarantees required by Thailand of visitors from China serve as another barrier to such traffic.

Cross border traffic in workers is very strictly regulated, at least officially.<sup>7</sup> Despite (or partly because of) these restrictions, there is a thriving black market in, for instance, Burmese labor in Northern Thailand. Wide inter-country wage differentials and growing labor shortages in Thailand as a result of rapid industrial growth, and resulting pressures on the competitiveness of the country's traditional industrial and processing sectors, make access to labor from neighboring countries especially attractive. This can be accomplished, in principle, either by moving factories to the regions/countries where the "cheap labor" is located, or by moving the labor to the higher wage countries. In general, capital tends to be more internationally mobile than labor. However, regulatory and other costs associated with investing in some regions might make it more attractive for investors to press for relaxation of restrictions on labor movements. Divestiture requirements and/or restrictions on property leasing by foreign investors are often a barrier to capital flows.

### **Preliminary Assessment of Some Options and Opportunities**

The changes that are occurring in the economies of the golden quadrangle are enormous. Economic liberalization is releasing and mobilizing large amounts of capital and entrepreneurial resources. Improvements in transportation infrastructure are making possible many new forms of economic integration. If pressures from business and other interested parties can be mobilized to continue the process of deregulation, especially of trade, investment and transportation, this integration will be further encouraged.

#### *General Observations*

All of the changes under discussion here have a primary effect of lowering the costs of engaging in economic activities that have links across the region. The extent to which these changes in incentives will actually lead to increased integration is very difficult to predict.

And the precise forms of any of these changes are even more unpredictable. However, one thing that is clear is that it is very easy to overestimate both the amount of regional economic restructuring that will occur, and the speed with which it will happen as a result of these changes in incentives. This is true for a number of reasons.

First, adjustment takes time. It generally requires significant new investments and reorientation of patterns of economic activity. As a simple example, consider the case of tourism development in Xisuangbanna. This prefecture currently has a very well developed infrastructure for local and low budget foreign tourism. A huge network of small hotels and guest houses provides accommodation for up to a million such tourists per year. Local and chartered buses are the main form of transport for these tourists. They eat in small restaurants and food stalls.

Suppose now, that the changed economic environment were to lead to a significant increase in demand by more "up-market" foreign tourists. What would be the effect on the numbers and the mix of tourists? The biggest constraint on a rapid expansion in up-market tourist traffic is the complete inadequacy of the local hotel, restaurant and transportation infrastructure. As mentioned earlier, there is only one "up-market" hotel in Jinghong, whose condition is less than that of a poor two-star provincial hotel in Thailand. One other higher quality hotel is under construction. The arrival of 100 Thai tourists in Jinghong is a major event in the prefecture. These tourists, who take only 20 percent of the capacity of the main hotel in town, still use up a significant share of the capacity of local restaurants.

How quickly can existing capacity be expanded and upgraded? A Thai investor has been engaged in negotiations for over a year to take over a major share in the ownership of the existing hotel in Jinghong, and an agreement has not yet been reached. Despite all of the talk of increased flows of up-market tourists, there are few signs of other new investments. This is not to say that such investments will not be forthcoming. It is only to point out that it will take some time for Jinghong, a tourist "mecca" in China, to transform itself from something like Chiang Mai of 30 years ago to a "modern" high volume up-market tourist destination of the sort that Chiang Mai is today. Similarly, even a significant freeing up of restrictions in China and Thailand which currently impede the flow of Chinese tourists to Thailand will not lead to a large inflow of high spending Chinese tourists to Northern Thailand. In this case, the constraint is less in the form of infrastructural inadequacies than in the still relatively low average incomes of the vast majority of Chinese tourists. This will also take some time to change.

The same will be true of significant changes in exports or imports of primary, semi-processed or industrial products between Thailand and the other

countries of the golden quadrangle. Some activities, of course, will be capable of adapting and adjusting much more quickly than others. The relative speeds of adjustment of different sectors will depend on many factors, including the amounts and types of investments required to take advantage of new economic opportunities, and the size of the changes in incentives resulting from increased economic integration.

The latter consideration leads us to the second reason for caution in making predictions about the pace of economic change in the near future. While there have been and will continue to be major changes in economic incentives resulting from liberalization of rules and regulations, and improvements in transport and communications infrastructure, some barriers will inevitably remain. Therefore, while reductions in transport costs might tend to increase the attractiveness of trade in some commodities between, say, Southern China and Thailand, Thai or Chinese import tariffs or other non-tariff restrictions, many of which are quite significant in both countries, might still be sufficient to block or seriously reduce the volume of trade that actually occurs. Even worse, some governments might attempt to capture some of the potential rents from trade possibilities opened up by improved transportation by increasing tolls and other charges for transshipment of goods through their territory. To the extent that such tolls reflect the actual costs of transport improvements or of maintaining new facilities, of course, they are legitimate economic charges. *Not* charging for the use of new facilities would actually represent a distortionary subsidy of trade in such circumstances.

Finally, from the narrower viewpoint of the prospects for Northern Thailand and Chiang Rai province in particular, one other important qualification must be borne in mind. From Chiang Rai's perspective, the regions of Thailand constitute a highly open economy, with free trade in goods, few, if any, restrictions on or impediments to investment flows and, of course quite free mobility of labor. Transport links between Northern Thailand and the rest of the Kingdom are very well developed, especially when compared to those between Northern Thailand and the other countries/regions in the golden quadrangle. This means that it will be very difficult, except through policies that are contrary to the larger interests of Chiang Rai itself and/or Thailand in general, for Chiang Rai to establish any sort of monopoly within Thailand over benefits deriving from greater economic integration in the golden quadrangle.

For instance, in the event of an expansion of investment opportunities in Burma, Lao or Southern China as a result of such integration, these opportunities will be available to all investors in Thailand, and not just those in Northern Thailand. Similarly, increased availability of raw materials and agricultural products from any of these countries as a result of improved transportation

will not be the preserve of users in Chiang Rai, even if it does happen to be the entry point of these goods into Thailand. Users of these raw materials throughout all of Thailand will be able to compete for them in the domestic market. And, in the event of the freeing up of visa and other travel restrictions on outbound tourists from China to Thailand, any new tourists would be free to travel to any part of Thailand, and would not necessarily confine themselves to Chiang Rai or even Chiang Mai. Many of them might well bypass Chiang Rai entirely. The general message is that, whether Chiang Rai will get any particular benefits from these new opportunities will depend on whether it has or can create any special competitive advantages over other areas in Thailand. Several natural or policy-induced advantages for Northern Thailand are sometimes discussed in this context.

### *Specific Possibilities/Options*

Northern Thailand clearly has some locational advantage over points further south in Thailand with respect to raw materials that might be shipped by river or by new highway links from other countries in the golden quadrangle. There are, however, two obvious caveats to this. If improved transport makes it cheaper for Northern Thailand to procure raw materials from, say, Southern China, the same transport improvements will also make it less costly to ship *processed* raw materials from China. Therefore, unless Northern Thailand has a clear cost or quality advantage over Southern China in the processing of agricultural and other primary products, the improvements in transportation might result principally in increased exports of processed goods to Thailand.<sup>8</sup>

In light of this consideration, it seems likely that new raw material-based exports from Southern China as a result of improvements in transport links will be in at least partially-processed form. Such processed goods might compete with and displace the products of currently existing processing industries in Northern Thailand. This is likely to be true of instant noodles and a wide range of agricultural products. Furthermore, given that raw material imports into Thailand do increase, if the ultimate market for the finished product is beyond Northern Thailand (in Bangkok, say, or even in export markets), it is not obvious that Chiang Rai will be the most cost-effective location to do the final processing. Having voiced these qualifications, however, it does seem possible that Chiang Rai will benefit from increased raw material processing activities, at least in some sectors, as a result of greater integration with the golden quadrangle. As always, of course, Thai consumers should almost certainly benefit from increased availability of products from the golden quadrangle. Based on pure locational considerations, consumers in Northern Thailand should be the biggest beneficiaries.

Northern Thailand should also have some locational advantage with respect to increased tourism. This can work in two ways. First, and maybe less obvious, is the fact that improved boat and road links will make Southern China, Lao and Burma more accessible from Northern Thailand. Chiang Rai and Chiang Mai might, therefore, benefit from increased travel by tourists wanting to put together Northern Thailand and some or all of these other destinations in a single package.

Second, and more obvious, is the possibility that transport improvements could lead to increased tourism to Thailand from Southern China. Low income, low budget Chinese tourists are much more likely to be able to afford land-based (and possibly river-based) transport from China through Lao or Burma, rather than air travel. Furthermore, natural cultural affinities between many people in Southern China and those in Northern Thailand also make Chiang Rai and Chiang Mai a natural destination for these tourists.

As mentioned before, however, very demanding financial guarantees required by Thai authorities, and difficulties faced by Chinese tourists in obtaining visas are both significant barriers that will probably remain even after transport improvements are in place. A possible solution to these problems, which would actually increase the locational advantage of Northern Thailand relative to the rest of the Kingdom, would be an agreement between the governments of the countries in the golden quadrangle to institute a special system of border passes for Chinese tourists, which would give them access to certain areas in the three neighboring countries, with less onerous visa and other financial restrictions. As most of the Chinese tourists who would take advantage of this are, however, likely to be, and will remain for some time, relatively low budget travellers, the total amount of increased tourist earnings will be far less than would result from an equal increase in numbers of tourists from other countries.

A number of possibilities are also being discussed for the creation of special economic zones somewhere along the borders of Thailand with Burma and/or Lao. Specific locations are mentioned in all three of these countries. The extent of infrastructural investment and of special economic privileges for companies operating in the zones also vary.

One proposal is for a special zone in Chiang Rai which would include, in addition to standard tax facilities for export processing zones and full infrastructural provisions, special facilities for the legal hiring of low wage Burmese workers. One would have to question the general wisdom of such a proposal. First, in the absence of cost-recovery pricing on infrastructure, the zone would provide a net subsidy to producers located here. Second, with all of the tax concessions being mentioned, the net fiscal benefits to Thailand would almost certainly be negative. And third, the other potential benefit of such a zone – the one which usually justifies such zones,

increased employment and wage benefits to Thai workers – would be minimal at best in this case, since the majority of the workers would be Burmese. To the extent that activities within the zone displaced production outside of the zone which would have employed a higher proportion of Thai workers, the employment benefits would also be negative.

Without more information, it is difficult to judge the specific merits of this or other proposals for various kinds of economic zones within the golden quadrangle. However, two general observations are that it is preferable to: 1) wherever possible, adjust general tax and tariff levels facing all producers, rather than making ad hoc adjustments and exceptions, and 2) where general taxes and tariffs cannot be changed further, but it is desired to make exceptions for particular groups of producers – for example, exporters – it is better to make these exceptions available to all exporters meeting program requirements, regardless of their location. Requiring that exporters set up production facilities in special processing zones to obtain export tax privileges can be quite costly and economically wasteful.

## ENDNOTES

- 1 The World Bank classifies the following eight economies as "East Asian Miracles": Hong Kong, Indonesia, Japan, Korea, Malaysia, Singapore, Thailand and Taiwan. (World Bank, 1993)
- 2 For a more complete discussion of the evolution of Thailand's recent economic success, and especially its pattern of rapid export growth in the East Asian and global context, see Akrasanee, Dapice and Frank Flatters (1991).
- 3 See Overholt (1993), p. 64, chart 14.
- 4 A group of Thai investors is interested in entering a management agreement with the Chinese owners of this center.
- 5 There is some concern that a short run effect of unifying and centralizing the regional swap markets for foreign exchange, which is also occurring as part of these reforms, will be to reduce access to foreign exchange for some traders and investors. The long term liberalizing effect of these reforms, however, does not seem to be in question. See Joseph Kahn (1994).
- 6 Kunming's desire to maintain its position as a gateway to Yunnan province is one of the barriers to these discussions.
- 7 Chiang Rai allows the use of foreign workers in four districts.
- 8 An escalating Thai import tariff structure, with rates increasing according to the degree of processing, would certainly create a policy-induced relative cost advantage for processing in Thailand. It is possible, of course that China would react to such blatant use of tariff instruments by imposing offsetting taxes on exports of raw materials, with the rate of tax varying inversely with the degree of processing in China.

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# Enforcing Environmental Quality: Why Trade Policy Isn't the Answer

Maureen Grewe\*

The decade of the 1990s has seen the further strengthening of popular concern for the environment. The 1992 United Nations Conference on Environment and Development held in Rio de Janeiro, which followed numerous international conventions and conferences seeking ways to cope with environmental endangerment, drew widespread participation and media attention. The environment played an important role in the North American Free Trade Agreement (NAFTA) negotiations, and was raised as an issue, although not formally brought to the negotiating table, under the Uruguay Round of the GATT talks. It is likely that the environment will again become a negotiating point under the next GATT round.

In reality, most environmental issues are domestic in scope, with a non-optimal amount of pollution and environmental degradation within national borders. This results from the miscalculation of shadow prices and the externalization of both pollution and natural resource usage costs, as well as the lack of well-defined property rights. The environment takes on an international dimension when related to transnational pollution or protection of the global commons, such as the ozone layer and biodiversity. Why then this urge to link trade and the environment?

## THE INTERFACE BETWEEN TRADE AND THE ENVIRONMENT

There are two approaches to the trade-environment question. The first approach, usually taken by economists and free-trade proponents, is to try to gauge the presumably deleterious effects of environmental regulations on the battered world trading system. The second approach, advocated by environmentalists, is to look at the effects of trading patterns and policies on the environment, usually with the a priori view that free trade and unfettered development will exacerbate environmental degradation and pollution levels. It is primarily from this second camp that proposals arise to use trade sanctions as enforcement mechanisms for international environmental standards and agreements.

Indicative of the first approach, a recent World Bank report finds two main issues that link international

trade to transnational pollution,<sup>1</sup> and hence to GATT. The first is the question of the appropriateness of the use of trade barriers to regulate or diminish transnational pollution. The second issue is whether domestic regulations to control transnational pollution will affect trade patterns. These are both broad topics, with wide-ranging implications for national sovereignty, international competitiveness, social choices and technology transfer.

In the same report, the author also considers the second approach and suggests that the recent emphasis on the reform of trade and exchange rate policy as a means to further development has sparked debate over the environmental impact of these reforms.<sup>2</sup> These reforms raise such questions as whether trade causes a non-optimal rate of natural resource depletion and increased environmental degradation as countries strive to become competitive in the international marketplace, and whether a devaluation will increase the export of agricultural products in a non-sustainable way in the struggle to maintain foreign exchange earnings.

A report by the World Wildlife Fund for Nature states that: "The world consumption of natural resources, and the resulting impact on the environment, is greatly influenced by the patterns of international trade."<sup>3</sup> However, little empirical work has been done in this field to determine the exact relationship. Some work does exist on the relationship between economic growth and environmental quality. It provides conflicting results, however, and a generally accepted consensus has not been formed.<sup>4</sup>

Given the two general approaches, several possible reasons surface for the widespread desire to use trade policy as a means of enforcing environmental standards. Two are political reasons. Pushing the debate into the international arena allows for diversion of both attention and the need for action at the national level, providing an excuse for inactivity on the domestic front. International negotiations are notoriously slow and cumbersome, and "any lack of progress or inadequacy of standards in international treaties that are negotiated can be blamed on other countries."<sup>5</sup> The second reason is that it is easier for politicians to place restrictions on foreigners using trade policy measures, than to impose costs or further regulation on domestic industries and consumers, who make up their constituencies.

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A third reason, alluded to above, is the support of protectionists for trade policy measures. Industries facing declining international competitiveness can ascribe this to lower environmental standards and compliance costs abroad. Industrial lobbies can then use environmental protection arguments to call for subsidies, countervailing duties and the like. This teaming up of industry and environmentalists was a prominent feature of the NAFTA negotiations in the United States. Despite the convergence of protectionist and environmental interests, NAFTA was ratified by the U.S. Congress. Several environmental provisions were, however, added along the way and the narrow margin of the decision leaves open the possibility for future actions on this topic.

Yet a fourth reason for promoting the use of trade sanctions is the dearth of other "sticks" available for enforcing environmental standards, especially at the international level. The environment is not the first area to suffer from the inability to come up with a credible international enforcement mechanism. Moral suasion can only go so far.

#### ENFORCEMENT TOOLS FOR ENVIRONMENTAL POLICY

Two categories of tools for enacting environmental policy are command and control, and market-based mechanisms. Command and control policies consist of laws, regulations and standards implemented by national governments to set caps on certain types of emissions, and require pollution abatement equipment for particular industries, for example. The governmental authority to tax, fine and imprison is the mechanism used, often involving substantial monitoring and enforcement costs.

A 1985 OECD study reviewed regulatory environmental policies in the OECD countries, finding them inefficient because they applied uniform standards resulting in conditions that were either too weak or too strong for individual industries. The study found that regulations were treated as "permission to pollute," as there were no incentives to reduce pollution below stipulated thresholds. Regulations can also discourage economic development, sometimes hindering the implementation of new processes and entrenching old and approved, though regulated, means of production.<sup>6</sup>

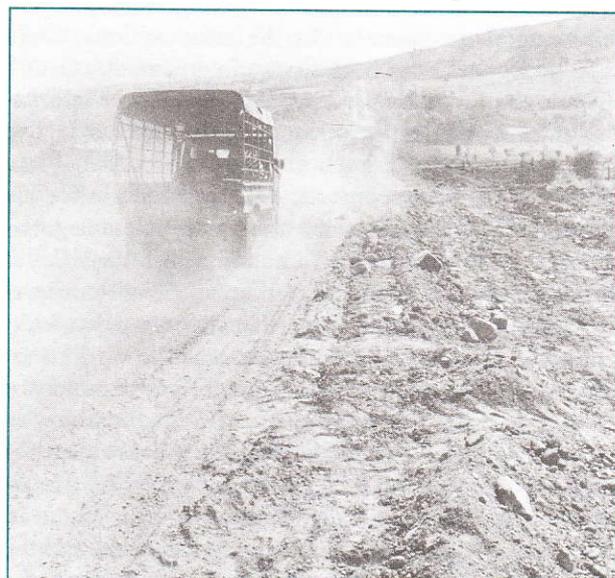
An alternative method of implementing policy is the use of market-based incentive measures. These mechanisms seek to change the production and consumption decisions that result in environmental degradation and pollution by internalizing costs which were previously unpriced in the market, or through establishing well-defined property rights. This can be achieved through user charges for water and other natural resources to which producers and consumers previously had free access, emissions permits for air and

water pollution, and taxes. By altering prices, these measures address environmental problems at the sources by affecting supply and demand. The market approach also allows firms to develop innovative and efficient methods for dealing with pollution that are appropriate to their specific industry and business strategy.

To date, the developed countries have almost universally adopted control, rather than market, measures for implementing their domestic environmental policies, despite the overwhelming evidence that market measures are more efficient. One reason for this is the need to identify "acceptable levels" of pollution for market-based alternatives, such as emissions permits. Many environmentalists are reluctant to target any level of pollution as acceptable, or to acknowledge the economic trade-offs of environmental protection.

Another reason is that government regulation is easier and quicker to establish. These measures attempt to clean up the results, rather than dealing with underlying causes. As such, they encourage evasion and cheating. One relevant example is the ban on logging in Thailand. As this policy did not affect the world price of or demand for logs, it provided incentives for "illegal logging, smuggling and additional profits for those prepared to take risks" and for the migration of unsustainable logging practices into Burma and Cambodia.<sup>7</sup>

Market measures are beginning to be put into use. Additional research into effective implementation and ways to overcome political hurdles is, however, necessary before these methods become widespread. Similar to the command and control measures, the market-based policies depend on cooperation at the national level, as they also use government authority to tax and assess user fees. Thus, another problem requiring research is a way to overcome the lack of institutional capacity in the developing countries to handle the administration of such taxes and user charges.



*Recent Thai environmental policies seek to slow the deforestation that threatens future economic growth.*

## INTERNATIONAL POLICY RESPONSES

In the international trade arena, policy actions can take on three distinct environmental purposes. The first is the enforcement of domestic product standards through border measures to exclude the import of products not meeting these standards. Standards can relate to product content, packaging or the production process for the goods.

The second purpose is the enforcement of international agreements, such that countries which are out of compliance with these agreements will face trade sanctions or restrictions on the imports of related products.

The third purpose of trade policy actions is to encourage or threaten other countries to adopt particular environmental standards. Policy actions could include restrictions or bans on imports that do not comply with the standards in question, and conditionality on further trade liberalization with those countries.<sup>8</sup>

In the case of the United States, one author who studied Congressional voting behavior on environmental issues states that "evidence is strong, although admittedly not consistent, that environmental concerns can act to limit Congressional support for liberal trade."<sup>9</sup>

Specific actions proposed to protect the environment in the international trade arena have included suspending the implementation of such trade agreements as the Uruguay Round agreement pending environmental assessments and any necessary revisions, allowing unilateral trade actions to protect the environment beyond national boundaries, allowing discrimination between "like" products on the basis of production methods, the development of natural resource accounting systems, and harmonization of international environmental standards.

The suggestion of suspending the implementation of the Uruguay Round may be an attempt to make the GATT agreement compatible with international environmental agreements. As the same actions would then be illegal under both types of agreements, GATT dispute resolution methods would help enforce international environmental agreements. However attractive this might be in fostering consistency and adding force to environmental agreements, it is a politically infeasible alternative. After seven years of often turbulent negotiations, the participating GATT nations will not indefinitely postpone the agreement pending an environmental assessment that could jeopardize hard-won commitments and possibly irreparably damage the world trading system. The conclusion of the Uruguay Round was viewed by many as a necessary step in maintaining an open trading system and averting the moves down the path of protectionism taken in recent years. An assessment of the agreement's impact on the environment is, however, a worthwhile endeavor and would expand the pool of knowledge about the effects of trade on the

environment, possibly providing valuable insights to be used in future trade negotiations.

Unilateral trade actions and product discrimination violate existing GATT principles. They essentially restrict trade to promote specific environmental policies abroad, or enforce domestic environmental policies at national borders. As stated above, they can be enacted by placing restrictions or bans on the imports of particular products or countries. Unless compensatory lowering of tariffs on other products is granted, however, these types of measures would be condemned by a GATT panel. A recent example is the U.S. ban on tuna imports. Under Article III of the GATT, which deals with production methods, the U.S. argued that U.S. domestic product regulations prohibiting the use of fishing methods which capture and kill dolphins along with tuna could also be applied to imported tuna products. The GATT panel decided, however, that only measures applied to the actual product were covered and, thus, "regulations governing the taking of dolphins incidental to the taking of tuna could not affect tuna as a product."<sup>10</sup> Similar disapproval by GATT would be expected for environmentally-motivated trade policies that violate the MFN (most favored nation) or national treatment principles, or that raise tariffs above bound thresholds.

The development of natural resource accounting systems is an attempt to recognize the depreciation of the environment resulting from the usage of non-renewable natural resources, degradation and pollution in the national accounts system used to calculate Gross National Product (GNP).<sup>11</sup> Norway, France and the United States have started to implement these types of systems for use in managing natural resources.

The basic premise is that national income accounting is inconsistent in its treatment of natural versus other resources. Costs for cleaning up pollution, for example, are added to GNP if those activities are undertaken by firms or individuals other than the original polluter, but reduce GNP if the costs to prevent pollution are undertaken as part of the original production process. Using national accounts which give a consistent and realistic picture of a country's sustainable income-generating potential can help mobilize support for environmental programs at both the national and international levels, and provide the data to develop more efficient methods of environmental protection.

Harmonization of international environmental standards seems like a reasonable proposal at first glance, as it would eliminate the need for companies to address different standards and policies in different countries that might hinder investment or competitiveness. Differences in social choices, levels of economic development and in the absorptive capacities of national environmental endowments, however, would make harmonization extremely problematic.

The first issue to be addressed is whether to harmonize product or process/production standards. An ensuing question: Who chooses the “optimal” level of pollution? A research project carried out by TDRJ studied the interaction of the environment and economic growth, looking at tradeoffs involved in converting forest to farmland.<sup>12</sup> The contradictory effects are the rises in agricultural incomes from increased output against the losses due to decreased productivity resulting from soil erosion and other adverse effects of deforestation.

The crux of the study is that there is a “balance point” to be found between resource exploitation and economic development. It is unlikely that this balance point will be identical for nations with different natural resource endowments and at varying levels of economic development. Individual approaches are necessary, leading to the conclusion that harmonization of environmental standards is inappropriate.

### WHY TRADE POLICY IS NOT A “FIRST-BEST” SOLUTION

The theory of “first-best” tells us that market interventions are only optimal solutions when they seek to correct the source of market distortions. In the case of the environment, the source of the distortion is the misallocation of resources stemming from either a failure to internalize all the costs associated with the “usage” of the environment or inadequately defined property rights. Trade policy measures do not address the source of this distortion, but only serve to further misallocate resources. To the extent that trade policy and trading patterns themselves contribute to environmental degradation and pollution, the root of the problem is nevertheless the externality and public good issues.

A recent study used the NAFTA case to predict the effects of the imposition of a pollution abatement and control expenditure (PACE) equalization tax by the United States on Mexico.<sup>13</sup> The trade effects found by the study were modest, amounting to at most a 2 percent loss in export earnings. The author estimated that there was an upward bias on the results and included a sensitivity analysis showing a range of export contractions from 1.2 to 2.6 percent of total exports. The author argued that there were three ways in which a policy of this type is flawed.

The first is that it has dubious environmental effects because the tariff revenue flows to the U.S., not to Mexico to rectify the problem.

The second flaw is that, as a competitiveness policy to level the playing field, the PACE gives only a minor margin of protection to domestic industry, given that PACE costs were found to be less than 3 percent of total output, even for “dirty” industries.

The third reason this is a bad policy is that it is GATT-illegal, unless compensatory tariff reductions are offered on other imports to maintain the maximum

overall binding tariff level. The author thus concludes that a PACE tax or similar instrument is bad environmental policy, bad trade policy and has negative consequences for the GATT system.

It is also unlikely that trade sanctions would be successful in imposing “environmental cooperation” on third countries without also incurring other negative side effects. A current example of the ineffectiveness of trade policy in achieving non-trade related goals is the ongoing tussle between the U.S. and China over human rights. The U.S. has threatened to revoke China’s MFN status if “improvements” in human rights are not evident. This type of policy creates a good deal of ill will, as countries are forced to choose between losing face and economic injury. If such a threat is used too often, or not carried through, it becomes ineffective. Once MFN status is revoked, however, it is no longer available as a weapon and reduces the threatening country’s leverage. The imposing country is often viewed as meddling and unreasonable, which can damage other diplomatic and bilateral relationships.

### RELEVANCE FOR THAILAND

Thailand has experienced rapid growth over the past few decades, transforming it from a predominantly agricultural to a manufacturing-based economy. The structural changes have brought new problems for Thai society, including rapid urbanization and a widening income distribution. Land scarcity, resulting in deforestation, with its problems of soil erosion, sedimentation and increased carbon dioxide emissions, is one of several issues attracting national attention. Increased demand for water by the urban and industrial sectors, coupled with below average rainfall in recent years, has exacerbated water resource allocation problems. Water pollution is creating further threats to water availability. Air pollution, increased by traffic woes and the generation of electricity by coal-burning methods, is especially worrisome in the growing Bangkok metropolis.<sup>14</sup>

Recent environmental policy actions show Thailand to be “one of the most active developing countries in the international environmental arena,”<sup>15</sup> while “public awareness of environmental issues is high.”<sup>16</sup> Initiatives developed by the Thai government include an endorsement of the Polluter Pays principle in the Seventh National Economic and Social Development Plan (1992-1996), the Enhancement and Conservation of National Environmental Quality Act (1992), measures to promote unleaded gasoline, and the institution of an Environmental Fund to promote investment in pollution control.<sup>17</sup> While much remains to be done, including the strengthening of monitoring and enforcement capabilities and the integration of environmental concerns into economic policymaking, these initial steps are a sound starting point.

This proactive stance reflects the Thai government and people's recognition that, to be sustainable, economic growth must be balanced with environmental priorities. Despite recent efforts to formulate its own environmental policies, Thailand is unlikely to have the same social choices and pollution tolerance level that environmentalists or developed countries might like to impose on it. As a potential NIC with export-oriented economic policies, Thailand is especially vulnerable to the trade policy whims of the industrialized countries. Policymakers, therefore, need to be aware of the direction of debate in international fora, and alert to policies that may jeopardize its economic growth. Promotion of environmental awareness and information exchanges through ASEAN and APEC will enhance Thailand's international image, while providing policymakers with information on the experience of other countries facing similar problems and challenges.

## CONCLUSIONS

The sources surveyed all identified multiple areas for further research in assessing the impact of trade and international trading patterns on the environment. Given the existing inefficient usage, even by the OECD countries, of regulatory rather than market solutions to environmental problems, it appears that there is also much room for research in the formulation of efficient and effective policies at the national level. Two possible areas for study are compensation for the trade-related impact of different environmental policies on competitiveness, and opportunities for transfer of green technologies. Both of these alternatives involve using incentives, rather than threats, to induce environmental cooperation, and allow for more efficient trading relations as well as achieving environmental goals.

The environmental issue has the potential to cause much damage to the international trading system, notwithstanding recent progress of the Uruguay Round, to the extent that it condones a certain amount of protectionism on environmental grounds. Environmental considerations, however, must be taken into account to ensure that short-term economic growth does not jeopardize the future availability of resources. Stewart Hudson of the National Wildlife Federation acknowledges the interaction between trade and the environment and supports a balanced approach to policy-making, summed up as follows:

"If understood in the context of sustainable development, environmental concerns and trade activities are not necessarily at odds, and should be dealt with in an integrated fashion. It is clear that trade policy which does not consider environmental impacts can undermine the natural resource base on which continued, or future, development depends. At the same time, it is obvious that environmental policy, framed without

regard to development needs, can be equally shortsighted."<sup>18</sup>

## ENDNOTES

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## Lead Poisoning – A Severe Threat to the Nation’s Health

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Chamaiphan Santikarn<sup>\*\*</sup>

**T**hailand is now facing serious problems of lead proliferation in the environment. High levels of lead, emitted by industry or the soaring number of automobiles, expose us to the risks of lead blood poisoning daily. This is a most unfortunate by-product of rapid industrialization and economic growth.

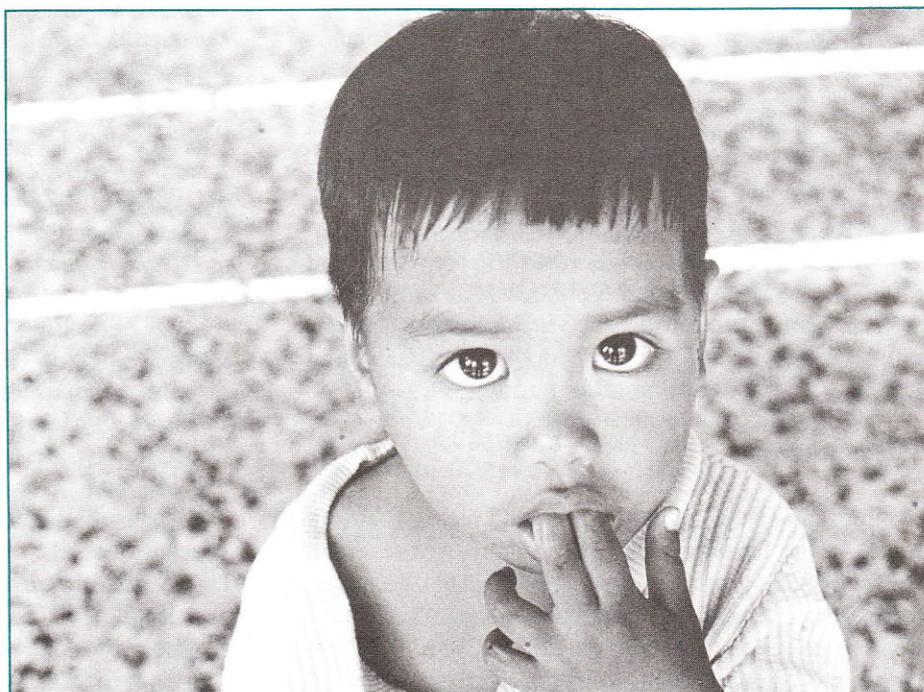
When lead enters the blood system, it can cause serious health problems in adults. In children, however, the effects can be devastating. Children can sustain lead in their bodies for 16 to 20 years, thus destroying the central nervous system and causing chronic toxicity in the entire body. Particularly at risk are children under six years of age, as this is the most important period in the development of a child’s brain. Studies have concluded that early exposure to lead can result in lower intelligence quotients, accompanied by learning disabilities.

Developed countries have long realized the widespread detrimental effects of lead poisoning and hence have conducted extensive research and drawn up new and stronger measures to control lead levels in air, water and food.

In Thailand, however, this issue has received little attention. The highest risk to the nation is from atmospheric lead and, other than the sole exception of introducing and promoting unleaded gasoline, no other measure has been taken to protect Thai citizens from being irreversibly damaged by this poisonous substance.

This article summarizes information from international and domestic studies on environmental lead poisoning.<sup>1</sup> The data provided will hopefully foster awareness of this problem in Thai policymakers, so they can design policies to minimize the country’s lead emissions. It is also hoped that it will encourage cooperation

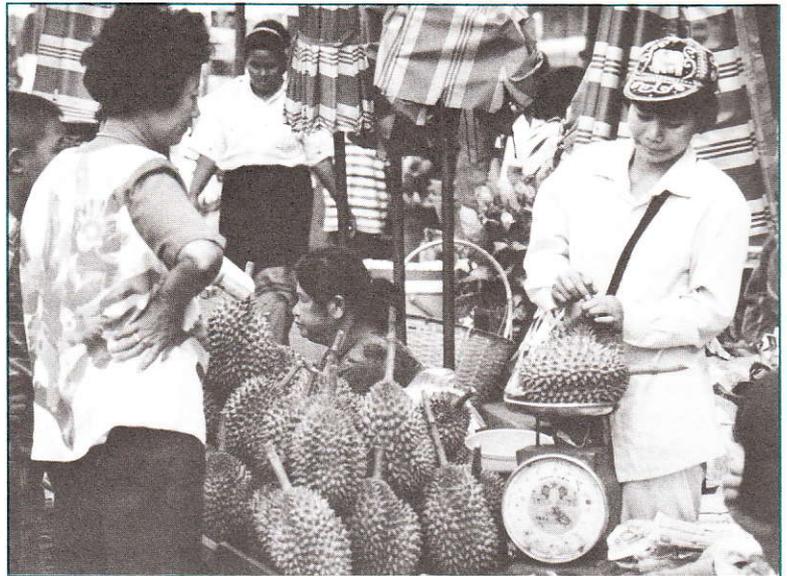
*Children under six years of age are particularly vulnerable to lead poisoning.*



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*Food bought from vendors along roads with heavy traffic may contain high levels of lead.*



between the public and private sectors in finding solutions, so that the nation's health, particularly that of its children, can be better protected.

#### WHAT IS LEAD? WHERE IS IT FOUND?

Lead is a heavy and malleable metal, dark blue-gray in color, which can be melted at very high temperatures. There are two types:

##### Organic Lead

If the gasoline used in a car has a too-low octane level, then "knocking" in the engine will be experienced. Gasoline from the primary distillation process has very low octane, and one of the methods used to raise the octane level is by adding lead in the form of tetraethyl or tetramethyl.

Organic lead is emitted in the combustion of benzene. One percent is released in the form of organic lead (70-75% is in the form of inorganic lead salt), which vaporizes into the atmosphere. Organic lead is relatively more dangerous and widespread than inorganic lead because of its better evaporation properties.

##### Inorganic Lead

Inorganic lead, used in compound metal, is always found in the form of salt. Among its many uses, lead oxide is used as protection against rust in metal paint and for making electrodes for car batteries. Inorganic lead also comes in the form of arsenate lead, used as a pesticide, and cillitate lead, which is mixed into ceramics to give a smooth and shiny finish.

Many industries use lead, including publishing, toys, electric cables, bullets, tube lead, and rubber processing. Most of us, therefore, run high risks of being exposed to

lead during our daily life. Inorganic lead is also emitted when benzene containing a lead chemical compound is used in motor vehicles. The difference is that inorganic lead is released in higher amounts and in particles that are smaller than vaporized organic lead particles. Inorganic lead particles in the air can be as small as only one to 50 microns.

On emission, a lead particle has a diameter of around 0.15 micron and, when merged with other particles in the air, will rapidly increase in size. When large enough to be visible, lead particles are called "dust." Dust particles vary in size and, the smaller they are, the more harmful they are to human health. Particles of less than 10 microns in diameter are particularly harmful as they are small enough to reach the lower part of the respiratory system.

#### HOW DOES LEAD ENTER THE BODY?

Lead can enter the body in various ways—through the respiratory system, dietary route, or pores in the skin.

A U.S. study found that in big cities adults absorb approximately 100-350 micrograms of lead per day. An estimated 50 micrograms per day is inhaled through the respiratory system and of this 20-50 percent will accumulate in the body, raising blood lead levels.

Inorganic lead emitted from motor vehicles is more easily absorbed by the lungs. Hence, it accounts for 40 percent of the total lead inhaled. The effectiveness of lead absorption depends on such factors as the size of the lead particles, age, physical condition and respiratory habits.

A 1977 World Health Organization study of the relation between lead absorption and age found that children under five years of age can absorb up to 50 percent more than adults of the total intake of compound lead substances. In comparison, an adult's dietary

route system absorbs approximately 20-30 percent of the lead intake. A 1981 study found that the lack of iron, calcium, protein and manganese in the body accelerates the speed of lead absorption.

Unlike organic lead, inorganic lead cannot be absorbed through human skin. Large dust particles only reach the upper part of the respiratory system, later to be dispelled as phlegm. Smaller particles first pass through to the air pouches in the lungs and then go into the blood stream.

When lead passes into the blood stream, it spreads throughout the body. Some 95 percent will accumulate in the various parts of the body, particularly the teeth, liver, lungs, kidneys, brain and spleen. In cases of exposure over a long period of time, most of the lead will remain in the bones. This does not cause bone deterioration, but the lead can remobilize and cause lead poisoning symptoms, even when the person is removed from further exposure.

Measuring the uptake, distribution and equilibration of lead in the blood, bones and body tissue is quite complex. It is difficult, using existing models, to predict precisely how the body tissue will alter under various circumstances. Blood lead levels, for example, rapidly increase, then decrease, after initial exposures at high concentrations. A reduction in blood lead may, however, come from redistribution rather than ejection.

Lead has a "half-life" of up to 10 years in adults. This means that if the blood contains, for example, 10 micrograms of lead, it will take up to 10 years for the body to reduce this to 5 micrograms. As a result, high levels of lead are sustained in the blood over long periods.

Five percent of the lead that enters the body will be discharged via the kidneys, 78 to 80 percent will be emitted in the feces, and the remaining 5 percent may be ejected as perspiration or through the hair and nails. Even in people with normal health, for every 100 milliliters of urine, 5-8 percent consists of lead.

According to current Thai law, lead levels in adults whose employment involves working with lead should not exceed 60 micrograms per deciliter. For other adults, the level should not exceed 40 micrograms per deciliter and, for pregnant women and children, the level should not exceed 25 micrograms per deciliter.

### HOW DOES LEAD CAUSE TOXIC HARM TO THE BODY?

Adults absorb lead mainly from air and water—normally absorbing only 10 percent into the blood stream. In children, however, lead accumulates in the body for up to 20 years and spreads to many organs, such as the brain, lungs, liver, spleen and bones. The parts of the body that are most affected are:

*The blood system in the bone marrow.* Lead lessens the production of hemoglobin by up to three points, causing anemia in patients. Moreover, it disturbs the function of the hemoglobin's wall so that it becomes fragile and easily broken.

*The central nervous system.* Lead damages nerve cells and causes inflammation of the blood vessels. It can also cause the brain to become swollen, while destroying its chemical substances and nerve tissue. In severe cases, high blood pressure in the skull will cause headaches, dizziness or unconsciousness.

Children whose nerve cells have been completely destroyed may demonstrate abnormal behavior, becoming more and more irritable and mentally backward. Small children show slow intellectual development. Adults who ingest the toxin over a long period of time, will suffer pain, have weak legs and arms, feel disoriented, and their faculties will become blunted.

*The kidneys.* In patients with severe symptoms, the body becomes incapable of creating kidney vessels. For those experiencing lead toxin over a long period, the kidneys may become deformed.

*The heart.* Heart muscles will swell and become inflamed, spreading to the connective tissues.

*Other symptoms.* High levels of lead in the body can cause sterility in males because of the toxic effects on sperm. Pregnant women will suffer high blood pressure, which may cause them to give birth prematurely. Moreover, the lead substance can accumulate in many tissues, and approximately 80 to 90 percent will accumulate in the bones. Some studies have even found lead in mothers' milk.

### WHAT ARE THE EXPOSURE RISKS FOR CHILDREN?

In present-day Thailand, children are surrounded by lead—in household paint, gasoline, utensils, and particles in the air. Food and water can also be contaminated, particularly when bought from open-air markets or from street vendors along roads with heavy traffic.

Because of their tendency to put foreign objects into their mouths, children ingest much more lead into their bodies than adults do. Dyes with high lead contents are often used in materials for making toys. Children who play with such toys are, therefore, at high risk.

### SYMPTOMS OF LEAD POISONING

As with most illnesses, the symptoms of lead poisoning are more severe in children. In adults, blood lead levels of over 10 micrograms per deciliter can prevent the body's enzymes from building hemoglobin. They may experience high blood pressure with blood lead levels of 10-15 micrograms per deciliter.

In children, however, blood lead levels of only 10 micrograms per deciliter are related to low intelligence levels, nervous system development disorders and erratic behavior. Lead, even at this low level, also affects body growth, hearing ability and can cause children to have difficulty with balance. They may also have difficulty in synthesizing their thoughts and actions.

Children with lead levels of more than 25 micrograms per deciliter will have a small head radius, small chest radius and short height, and those with lead levels of 30 micrograms per deciliter will have difficulty in processing vitamin D within the body.

As for lead levels of over 40 micrograms per deciliter, children will be anemic and suffer exhaustion, while adults will face an increasing array of disorders in many of the body's systems, such as sterility in males, malfunction of the kidneys, and a slowing of signals to the nerve ends. Adults will also experience high blood pressure and reduction in hearing ability. In some cases, they will suffer exhaustion, headaches and chronic stomach aches.

With lead levels of 50-80 micrograms per deciliter, children will have severe symptoms, such as acute stomach pains, permanent nerve damage, and blindness, eventually leading to death. Adults will be anemic and suffer severe headaches, while chronic kidney deterioration will cause fits of shivering throughout the body. If lead levels exceed 100 micrograms per deciliter, adults may suffer brain damage, or may even become unconsciousness and die.

#### DO LOW LEVELS OF LEAD IN THE BLOOD AFFECT CHILDREN'S LEARNING ABILITIES?

Since 1970 in the U.S. and other developed countries, alarming increases in incidences of lead blood

poisoning has launched extensive research to find more and more ways to reduce lead emission levels. In the U.S., for example, blood lead levels were reduced from 60 micrograms per deciliter in 1969 to 40 micrograms in 1970, dropping to 10 micrograms per deciliter by 1991.

Research into the effects of lead poisoning on the central nervous system for the low level of 10 micrograms per deciliter has been continuous in the U.S. since 1976. Studies support the theory that even with blood lead levels of under 25 micrograms per deciliter, children will still have learning disabilities (Figure 1).

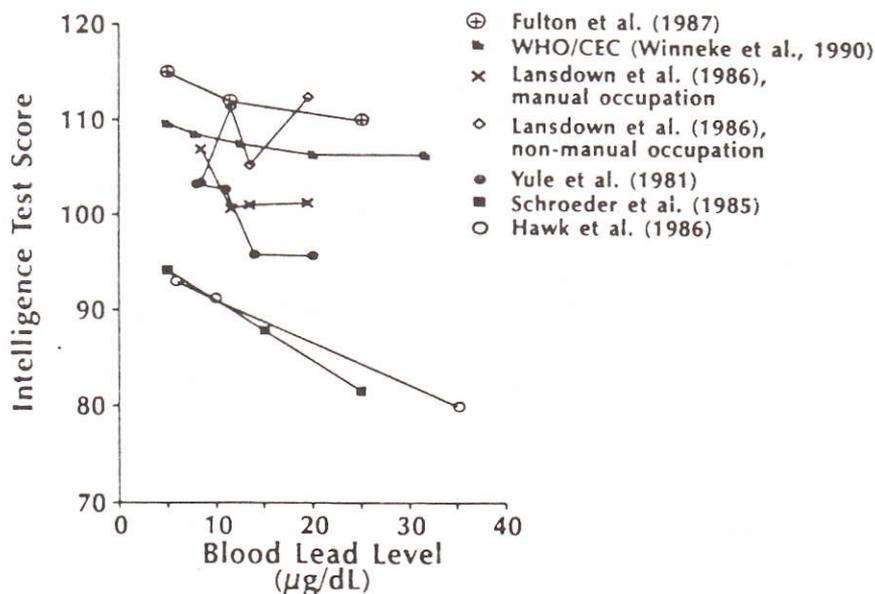
Another U.S. study compares the academic accomplishments of children and the lead levels in their milk teeth. Children with lead levels of more than 20 micrograms per deciliter in their teeth are seven times more likely to be unable to complete high school (Figure 2). They are six times more prone to have problems with reading, interpretation of words, in concentration, and in completing complex tasks. It has also been found that children with high lead levels in their milk teeth have blood lead levels of 35 micrograms per deciliter.

#### ATMOSPHERIC LEAD

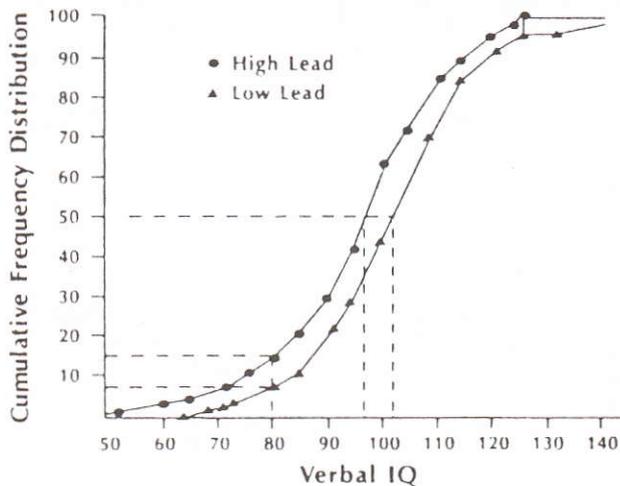
Industrial plants emit high levels of lead, but half of the lead in the atmosphere comes from cars run on gasoline that contains lead. A study of atmospheric lead in the rural areas of many countries shows high variation in levels, depending, of course, on how close they are to urban areas. In 1984, the atmospheric lead level in U.S. urban areas was found to be 0.36 micrograms per cubic meter.

A TDRI research study in 1986 by Chongpeerapien et al. compared atmospheric pollution from many different types of activities in Thailand. Results showed that 80 percent of Bangkok's air pollution is caused by

Figure 1 Blood Lead Levels and IQ Scores of a Cross Section of Children in the U.S., and Retrospective Cohort Studies\*



**Figure 2 Cumulative Frequency Distribution of Verbal IQ Scores in U.S. Children with High and Low Tooth Lead Levels**



vehicles. In 1987 alone, Bangkok consumed a reported 962 million liters of benzene. Around 384 tons of lead was emitted during 1987, or 1,052 kilograms per day. From these figures, it is clear that air pollution from traffic has for some time been high enough to have detrimental effects on human health. A report by the Department of Land Transport shows that the number of cars in the Bangkok area has increased tremendously, from 500,000 cars in 1978 to 2 million in 1989. When considering the one-year period from 1988 to 1989, the number of cars increased by more than 200,000, or approximately 13.3 percent. Increases of such magnitude, of course, certainly suggest that there will be dramatic rises in the amount of fuel burned. In 1991, the government announced its new policy of reducing the amount of lead emitted into the atmosphere. However, despite government subsidies making unleaded gasoline cheaper than leaded grades, the country's unleaded gasoline consumption is still only 13.6 percent of the total gasoline consumed.

The National Environment Board has set the air standard at no more than 10 micrograms per cubic meter. At night, Bangkok's lead levels drop to around 2 micrograms per cubic meter, while at noon heavy traffic causes levels of more than 7 micrograms per cubic meter. The most chronically congested thoroughfares are Petchburi Road, Yaovaraj Road and Rajdamnern Road, where lead levels are 16, 11.5, and 9.7 micrograms per cubic meter, respectively, during rush hour. In comparison, day-time levels in the U.S. are only 1-3 micrograms per cubic meter in urban areas and 0.1-0.5 in rural areas.

On examining the data on lead concentration in Bangkok's atmosphere from 1988 to 1993 (Table 1), it is apparent that lead levels in the air continued to rise to a peak level in 1991, then began to decrease in 1992.

An important point to consider is that Thailand's standard of atmospheric lead level is set at six times that of the United States. This figure was arrived at many years ago, before the harmful effects of lead poisoning became apparent. This standard must, therefore, be revised to adjust to the more accurate information now available.

### LEAD IN FOOD

The World Health Organization sets lead levels in food at no more than 425 micrograms per deciliter. In 1991, Thailand's citizens ingested approximately 50 to 250 micrograms per deciliter from food. Table 2 shows data on lead from different food sources. It is estimated that many Thais ingest 1.9 micrograms per kilogram per day of lead from food. If this increases by even one microgram per day, it will raise blood lead levels by 0.04 microgram per deciliter in adults, or 0.2 microgram per deciliter in children.

In 1990, it was found that 14 percent of Thai ceramic utensils contained higher than the standard safe lead level. In 1992, a joint Science Department and Ministry of Public Health study found that, although public transport drivers in Thailand ingest 88 milligrams of lead per day through the dietary system, lead from food is generally not yet a major source of lead poisoning in Thailand. Studies are continuing, however, on the effects of lead in food bought from street vendors. It is speculated that this type of food may contain high levels of lead.

### LEAD IN WATER

The WHO standard, set in 1971, permits no more than 0.5 microgram per liter of lead in water. In Thailand, studies by the Environment Health Division of the Ministry of Public Health in 1988 found that lead levels in Bangkok's water supply equaled 0.001 microgram per liter, still within the safety level. Analysis of the Chao Phraya River in 1992, however, yielded the worrying results shown in Table 3. In 1978-1988, the testing of water from 35 river routes (1,818 samples) in every region of Thailand found that in 30.6 percent of the sites sampled, lead levels exceeded the safety standard. The Pattanee River had the highest level, at 15.1 micrograms per liter. As shown in Table 4, of the rivers tested throughout Thailand in a 1991 study, the eastern region had the highest proportion of samples exceeding the standard levels of lead.

A 1984 Gulf of Thailand study by Songkla University's Faculty of Medicine found lead levels in the sea water of 7 ppb (parts per billion) and of 188 ppb in the sediment soil. These figures are significantly higher than the WHO standard of 4 ppb for sea water and 20 ppb for sediment soil.

Table 1 Lead Concentration in Bangkok's Atmosphere, 1988-1993.

Type	Place	Lead concentration (means: micrograms per cubic meter)					
		1988	1989	1990	1991	1992	1993
Temporary - along the roadside	- Pratounam	1.75	1.97	2.06	1.76	0.66	0.68
	- Yaovaraj	3.01	2.33	2.21	2.34	0.71	0.61
	- National Statistical Office	1.38	1.85	4.19	0.94	0.74	0.33
	- Bamrungmuang	2.29	3.34	5.09	1.92	0.37	-
	- Sukhumvit	1.06	1.71	-	1.06	-	-
	- Banglumpoo	0.91	1.15	1.31	1.11	-	0.37
	- Phaholyotin	0.72	1.18	0.86	0.62	0.94	0.35
	- Silom	1.95	3.14	2.73	1.90	0.65	-
	- See-Phraya	0.95	2.81	1.25	1.39	0.54	0.68
	- Huamark	-	-	-	1.75	-	-
Permanent	- National Environment Board	0.35	0.39	0.42	0.33	0.23	-
	- Chantarakasaem	0.35	0.41	0.36	0.32	-	-
	- Ban Somdej	0.32	0.33	0.38	0.22	0.21	0.22
	- Sukhumvit	0.46	0.48	0.72	0.37	-	-
	- Saovapa	0.48	0.53	0.41	0.39	0.24	0.26
	- Radburana	0.33	0.31	0.30	0.20	0.14	0.11
	- Bangna	0.36	0.35	0.86	0.18	-	-
Permanent (DOH) <sup>2</sup>	- Pradhibathr	-	1.03	0.59	0.81	0.32	0.28
	- Lardprao	0.58	0.50	0.58	0.40	0.15	0.20
	- Samrong	0.44	0.34	0.35	0.30	0.24	0.20

Source: Pollution Control Department, Ministry of Science, Technology and Environment.  
Department of Health.

### BLOOD LEAD LEVELS IN THAI CHILDREN

All studies conducted from 1986-1991 suggest that lead levels in the blood of Thai children are below the national standard of 25 micrograms per deciliter. But many studies indicate levels that far exceed the U.S. standard of 10 micrograms per deciliter, beyond which the brain and the central nervous system will be affected.

Since 1991, blood lead levels of children both in Bangkok and in rural areas have declined. The main reason for this seems to be the result of the government's

campaign encouraging people to use unleaded gasoline. But this does not mean there is room for complacency. As demand for transportation increases, more lead will be generated. Lead poisoning, therefore, remains a serious problem, particularly in Bangkok.

### CONCLUSIONS

In comparing sources of lead poisoning, it is apparent that the greatest risk in Thailand is from lead in

Table 2 Lead Concentration and Exposure from Different Food Sources in Bangkok

	Flour	Meat	Fish	Milk	Vegetables	Fruits	Sugar	Fruit Juice and Drink Products
Concentration* (mg/kg of food)	0.33	0.31	0.55	0.14	0.45	0.24	0.26	0.05
Exposure** (mg/kg of food)	1.6E-03	6.4E-05	1.3E-04	3.2E-05	5.0E-05	2.7E-05	2.1E-05	1.5E-05

Sources: \* Study of Contaminants in Foods, 1984-1986, Food and Drug Administration, Food Control Division, Department of Health, Ministry of Public Health (samples from Bangkok only).

\*\* Ranking Environmental Health Risks in Bangkok, Thailand, 1990, USAID and USEPA.

Table 3 The Results of Lead Analyses of the Chao Phraya River, 1992

Location	Province	Kilometers from the Gulf of Thailand	Lead levels ug/l
In front of the South Sai temple	Nakhon Sawan	340	0.40
Under the Tha Nam bridge	"	288	0.09
Provincial City Hall	Chai Nat	252	0.02
Promburi market	Singburi	189	0.02
Under Inn-buri market	"	219	0.07
Angthong bridge	Angthong	163	0.11
	"	-	0.03
Around the Thai Rayon plant			
In front of the Bangtoey temple	Pathumthani	92	0.01
Nonthaburi bridge	Nonthaburi	67	0.05
The Rama VI bridge	"	57	0.01
Sapan Bhutr	Bangkok	50	0.04
Sea Port	Bangkok	30	0.07
Bangsue canal, Pibulshongkram bridge	Chao Phraya connection canal		0.12
Samsean canal, Wat Boadsamsaen	Chao Phraya connection canal		0.08
Phrapradang	Samut Prakan	18	0.10
Amphur Mueng	"	7	0.12

Source: Environmental Health Division, Department of Health, Ministry of Public Health.

the atmosphere, particularly in over-crowded and traffic-tortured Bangkok. The picture of lead levels in Thailand's water is not quite so alarming. Many, but not all, water sources still appear to meet acceptable standards although levels do seem to be rising.

It is, therefore, urgent that measures are implemented to drastically reduce atmospheric lead. Reducing traffic congestion, promoting unleaded gasoline consumption, and imposing a higher tax on leaded gasoline, are all steps in the right direction. Reappraisals of the standards for water, food and air, as well as establishing lead content standards for paints, are urgently needed.

It is every child's birthright to be able to breath clean air and have as full and healthy a life span as possible.

The government will have to invest large sums of money to fight lead pollution. But when the health and intellectual faculties of a nation's children are at stake, it is money that must be spent and must be spent now. As our most valuable asset, we owe it to our children to do everything possible to clean up our fast deteriorating atmosphere.

#### ENDNOTE

<sup>1</sup> For a list of the studies used in this article, contact TDRI's Natural Resources and Environment Program.

Table 4 Results of Lead Level Testing of Rivers in Thailand

Region	Lead levels 1978-1988		1991
	Amount of lead in rivers	% of samples exceeding standard	Rivers containing lead along almost their entire routes
Central	2.05	30.0	Bangpakong, Pranburi, Pasak
East	0.29	41.1	Rayong, Trad, Veru, Chantaburi
North	0.22	13.7	
Northeast	0.49	23.1	Seaw, Chee, Moon
South	15.1	13.7	Pakpanang, Pattanee, Tapee, Kolok Chumporn, Pangrad

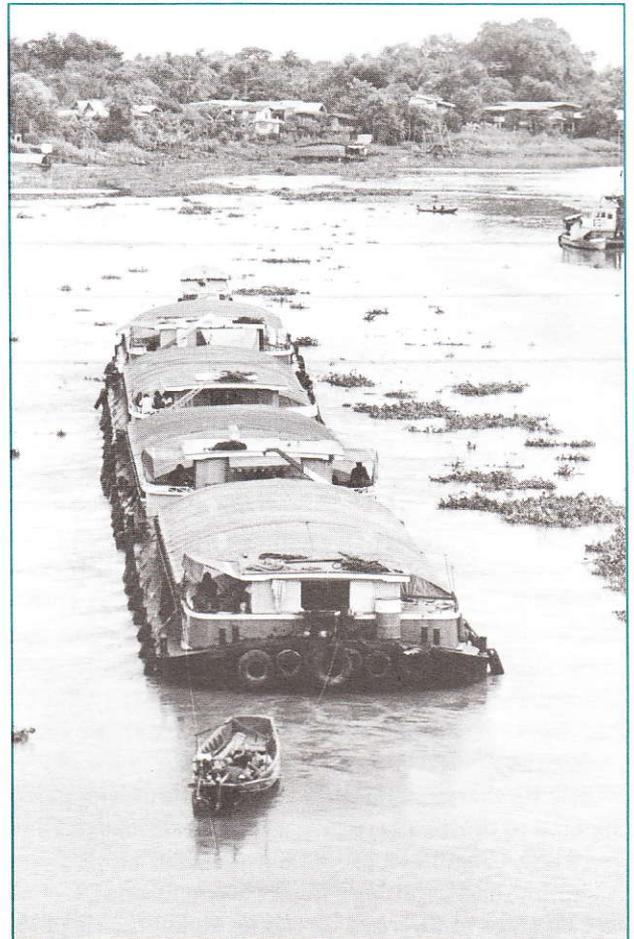
Source: *Water Quality in Thailand, 1992*, Environmental Health Division, Department of Health, Ministry of Public Health.

## Thailand's Drought Crisis\*

Over the past three years, drought caused by irregular rainfall has become a critical issue in Thailand. The Central plain, housing Bangkok's population of some 8 million people and most of the 4.5 million rai, or 720,000 hectares, of the country's irrigated paddy, has no large water reservoirs of its own. To meet growing demands for water, the Central plain thus depends almost entirely on the Bhumibol and Sirikit dams in the country's lower Northern region, particularly during the dry season—from November to May of each year. The dams have a combined capacity of 22.9 billion cubic meters of water. A minimum of 6.65 billion cubic meters of dead stock must be retained for electrical power generation and to allow sediments to settle. But the prolonged drought has contributed to a decline in the amount of water which flows into the dams each year.

While the quantity of rain fell to nearly half the normal level in 1993, the drought is only partly responsible for this year's water crisis. The decrease in the amount of water that flows into the two dams is also caused by increased water consumption upstream from the dams in the upper North, and by changes in land use patterns which have resulted in watershed destruction along the rivers and tributaries that replenish the dams. Indeed, the dams held their full capacity only once, in 1975. The yearly flow into the dams trickled from about 11 billion cubic meters 10 years ago to less than 6 billion cubic meters in 1993 (Figure 1). The combined water level in the dams at the start of this dry season (November 1993) was lower than ever before, at about 5.6 billion cubic meters (Figure 2).

Normally, the Royal Irrigation Department (RID) releases 6,600 million cubic meters of water for consumption during the dry season. Of this, 600 million cubic meters is reserved for the Metropolitan Waterworks Authority (MWA) to provide piped water services for Bangkokians. The remaining 6,000 million cubic meters is allocated for irrigation (4,100 billion cubic meters) and for flushing out saline water from the lower Chao Phraya basin (2,500 billion cubic meters). This year, however, as of January 1, only 1,948 million cubic meters were available for allocation from the dams. The amount of water for the Central plain this dry season is thus about one-third the normal need. Water allocated for irrigation has been slashed by the RID by some 3,200 million cubic meters as a result, which al-



*Even river transport, still an important means of moving goods, is threatened by the low water levels brought on by this year's water crisis.*

ready has caused serious shortages for Central plain farmers. Moreover, travel by boat in upstream areas may become impossible, and the intrusion of sea water will extend upstream from its current limit at Saphan Phut Bridge to the Rama VII Bridge. Already the MWA is worried that saline water soon will infiltrate its water processing facilities north of Bangkok.

It is estimated that, if there is a normal rainy season in 1994, the amount of water that drains into both dams could possibly reach 9.5 billion cubic meters by next November. This is the average inflow for the 20-year

\* Part of the study on "Institutional Problems in Thai Water Management: Challenges for New Legislation," by TDRI's Natural Resources and Environment Program. This project is supported by the United States Agency for International Development (USAID).

Figure 1 Yearly Inflow into the Bhumibol and Sirikit Dams, 1972-1993

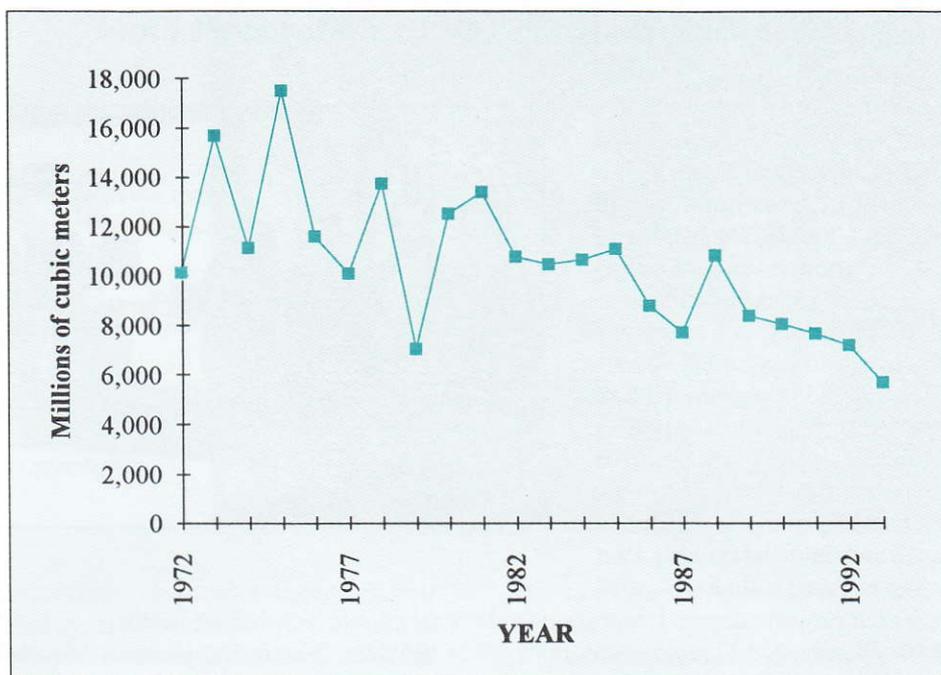
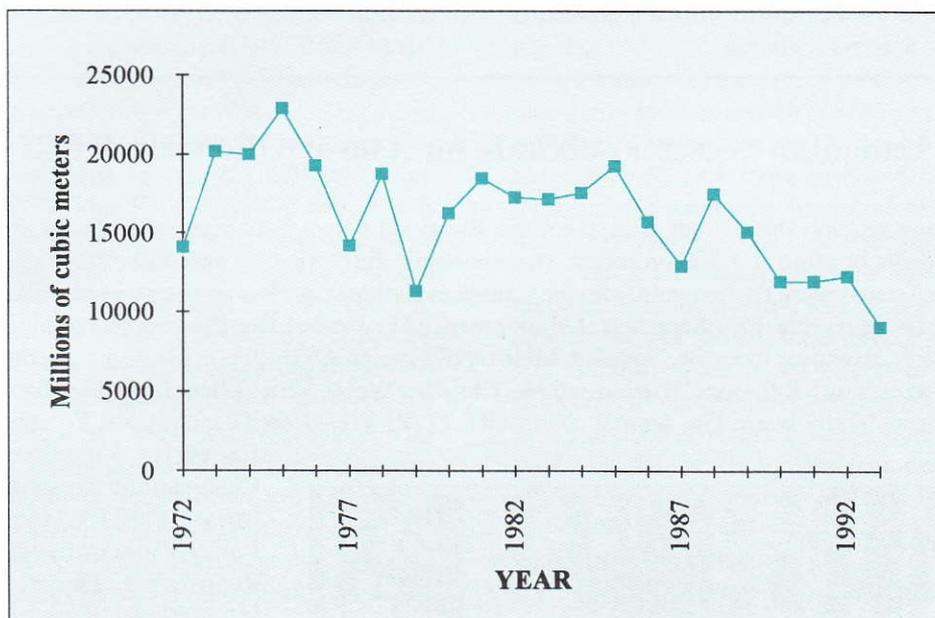


Figure 2 November Water Level in the Bhumibol and Sirikit Dams, 1972-1993



period 1972-1992. With this amount of water, Thailand will not suffer a water crisis next year, so long as consumption level remains as is. But this is not a likely scenario, and hardly a long-term assurance, for at least two reasons. First, the demand for water from the agricultural sector, from factories, and from domestic consumers is on the rise throughout the country. And second, Thailand's profligate water consumption habits are proving hard to discipline.

One solution, often advocated by engineers, is to increase the inter-temporal water supply by building

more dams and reservoirs. But this supply-side solution is only partial. Significant quantities of water could be saved by improving the efficiency of both the irrigation system and urban piped water infrastructure. The irrigation system in many parts of the country is rudimentary and wasteful. And water pipes in the cities are corroded and leaky. Most importantly, demand-side management must be addressed. Consumers could be encouraged to become more efficient if full-cost pricing of public water services for both rural and urban consumers were introduced.

## ESSO Contributes to TDRI's Endowment Fund

Esso Standard Thailand Ltd. has generously donated 650,000 baht, or US\$ 26,000, to TDRI's Endowment Fund. This is the third instalment of a total donation of 3.15 million baht, or US\$ 126,000. Mr. David H. Ledlie, Esso Chairman and Managing Director, presented the check to Dr. Ammar Siamwalla, TDRI President, at a ceremony held at the Institute's offices on Soi Asoke. The TDRI Endowment Fund, supported by contributions from private companies operating in Thailand and other friends from abroad, will help finance construction of the Institute's new building and also ensure its long-term growth and financial stability. Part of the Endowment Fund will also be used to carry out research projects deemed important to the Thai people, yet without funding.



*Shown at the Presentation Ceremony are, from left to right, Dr. Wisarn Pupphavesa, Director of TDRI's International Economic Relations Program; Dr. Nit Chantramonklasri, Director of TDRI's Science and Technology Development Program; Dr. Twatchai Yongkittikul, TDRI Executive Vice President; Dr. Ammar Siamwalla; Mr. David H. Ledlie; Mr. Smit Tiemprasert, Esso Director; and Mr. Pongsak Kunakornporamat, Esso Public Affairs Manager.*

## Canadian Secretary of State for Asia-Pacific Visits TDRI

On a recent mission throughout Asia, the Hon. Raymond Chan, Canadian Secretary of State for Asia-Pacific, attended a briefing at TDRI on recent Thai economic developments and the country's present role in the Southeast Asian region. Participants from the Canadian Embassy in Thailand were: H.E. Arthur C. Perron, Ambassador; Dr. Mary Sun, First Secretary (Development); Mr. Bruce Levy, First Secretary; and Mr. Richard Tetu, Counselor. Attending from the Canadian Ministry of Foreign Affairs were: Mr. Marius Grinius, Director of the Asia-Pacific South Relations Division and Ms. Christine Wong, Visit Officer from the Office of Protocol. Participants from TDRI were: Dr. Ammar Siamwalla, TDRI President; Dr. Twatchai Yongkittikul, TDRI Executive Vice President; Dr. Chalongphob Sussangkarn, Director of TDRI's Macroeconomic Policy Program; and Dr. Wisarn Pupphavesa, Director of TDRI's International Economic Relations Program.



*From left to right: H.E. Arthur C. Perron, the Hon. Raymond Chan, and Dr. Mary Sun.*

The briefing was followed by discussions on ways in which Thailand and Canada can collaborate with Indochina in furthering mutual economic development, how trade and investment can be fostered between the countries, and which aspects of Thailand's economic experience can benefit Indochina.

### TDRI to Study Huamark-Chachoengsao-Aranyaprathet Railway Corridor



As a follow up to the “SRT Master Development Plan Study,” the State Railway of Thailand has contracted TDRI to study future upgrading of the Huamark-Chachoengsao-Aranyaprathet Railway Corridor. Transport along this corridor will be affected by various major developments, including; Bangkok commuting needs, the Nong Ngu Hao airport, the Inland Container Depot at Ladkrabang, the Eastern Seaboard development, the planned new government office site at Chachoengsao, links between the Eastern Seaboard and the North and Northeastern regions, and trade between Thailand and Cambodia. These developments will shape the transportation needs along the Corridor. The project will be carried out by TDRI’s Human Resources and Social Development Program.

*Dr. Ammar Siamwalla, TDRI President (left), and Mr. Sommai Tamthai, Governor of the State Railway of Thailand.*

### TDRI Holds Press Conference to Present Macroeconomic Forecast for 1993-1994



*At the press conference: Dr. Ammar Siamwalla (left) and Dr. Chalongphob Sussangkarn.*

On December 22, 1993, Dr. Ammar Siamwalla, TDRI President, and Dr. Chalongphob Sussangkarn, Acting Director of TDRI’s Macroeconomic Policy Program, held a press conference at TDRI to present the Institute’s macroeconomic forecast for 1993-1994.

For 1993, TDRI has predicted, Thailand will experience an upturn in investments, tourism recovery, a private consumption surge, and satisfactory export performance. Economic growth for 1993 is predicted at 8 percent, somewhat higher than the 7.6 growth rate of 1992. Despite this healthy growth rate, however, the quality of life for the majority of Thais will not improve significantly.

As for 1994, the overall Thai growth rate is forecast at 8.6 percent and such external factors as oil prices, exchange and interest rates, and stronger growth in industrialized countries, should all favor the Thai economy. Two issues, however, require immediate attention: the worsening of income disparity and the growing current account deficit.

### NESDB Co-organizes Conference with TDRI

TDRI’s Macroeconomic Policy Program (MEP), in cooperation with the National Economic and Social Development Board (NESDB), recently organized a seminar on “Research and Information Development for Macroeconomic Policy Formulation.” Held over the weekend of February 19-20, 1994, at the Dusit Resort Hotel, Pattaya, participants included government officials, and members of the press and academia.

TDRI presented four papers for comment at the Conference. These were:

- “Productivity Growth in Thailand”
- “Determinants of Private Investment Expenditures and Direct Foreign Investment in Thailand”
- “Mobilization of Domestic Savings”
- “Large-Scale Investment Projects: 1992-2000”

## TDRI Co-organizes National Policy Dialogue on Science and Technology Development

TDRI's Science and Technology Development Program (STD), the Ministry of Science, Technology and Environment (MOSTE), and the United Nations Conference on Trade and Development (UNCTAD) recently co-hosted a National Policy Dialogue on "Endogenous Capacity Building in Science and Technology for Development." Held on February 24, 1994, at Bangkok's Imperial Queen's Park Hotel, more than 100 participants attended the Dialogue. These included policymakers, planners and administrators from the public sector, officials from international organizations, as well as the Thai academia.

Attending the Dialogue, shown from left to right, Prof. Vicharn Panich, Director of the Thailand Research Fund; Assoc. Prof. Somchob Chaiyavej, King Mongkut's Institute of Technology, North Bangkok; Mr. Kasem Snidvongse, Permanent Secretary, Office of the Permanent Secretary, Ministry of Science, Technology and Environment; Dr. Chatri Sripaipan, Project Director, Endogenous Capacity Building in Science and Technology for Development Project; Ms. Chodchoi Eiumpong, Deputy Permanent Secretary, Office of the Permanent Secretary, Ministry of Science, Technology and Environment; and Ms. Kobkeao Akarakupt, Director, Office of Science, Technology and Energy Policy and Planning, Office of the Permanent Secretary, Ministry of Science, Technology and Environment.



## New Contracts

### Pilot National Database for the Real Estate Sector

The Thai Real Estate Association has contracted TDRI's Macroeconomic Policy Program (MEP) to design a pilot national database for the real estate sector. The real estate sector is a significant part of the Thai economy, with many spill-over effects into the rest of the economy.

The present database for the sector is, however, incomplete and out of date. For appropriate policy formulation and better business decisions, the drawing up of an up-to-date National Database for the sector should yield major and positive results.

As well as the pilot plan for the database, the project will analyze what type of networking is required to link public and private agencies. It will also offer alternative models for setting up such a national database.

The project, begun in January this year, will take 10 months to complete.

### The Implications of Technological Advancement: International Competitiveness, Technological Dependence, Employment, and Skill Development.

This project has been contracted to TDRI's Science and Technology Development Program (STD) by the National Science and Technology Development Agency (NSTDA). An STD research team will explore trends and changes in the technological production processes of such key industries as textiles and garments and electronics assembly.

The study will emphasize automation technology, examining factors surrounding its diffusion and the likely effects on productivity, employment and technical skills. The study will also recommend policies and programs to help industries benefit from technological changes, while minimizing negative effects.

Begun in March 1994, the study will take 10 months to complete.

### NECTEC Co-hosts Seminar with TDRI

TDRI's Science and Technology Development Program (STD), in collaboration with the National Electronics and Computer Technology Center (NECTEC), recently co-organized a seminar to discuss the findings of STD's research project entitled "Effects of

the Restructuring of Tariffs on Electronic Parts and Their Import Procedure." The seminar was held at the Siam City Hotel on January 21, 1994. Participants included government officials, members of the private sector and academia.

## Completed Projects

### The Future of the Canned Seafood Industry

The Thai canned seafood industry is one of the world's largest. Thailand is the world's largest exporter of canned shrimp and crabmeat, and tuna, though tuna was not included in this study.

The canned seafood industry's rapid rise to its present position was due to the country's abundant natural resources. In recent years, however, there has been a growing realization that extraction from nature may have exceeded the natural potential. The Canned Seafood Group of the Association of Food Processors, therefore, commissioned TDRi's Natural Resources and Environment Program to conduct a one-year study assessing the future of the canned seafood industry.

The TDRi investigation into the raw materials of this industry revealed that the shrimp and crab catch has exceeded local supply potential, particularly through the use of highly destructive trawl nets.

Seafood quality, of course, depends on water quality and, although water quality has deteriorated significantly, laboratory tests indicated that contamination does not exceed safety levels.

The study also indicated that it would be extremely unwise for the industry to continue to harvest without giving priority to the conservation of mangroves and strict enforcement of the Enhancement and Conservation of National Environmental Quality Act (1992).

As a short-term remedy, the study suggests that raw material imports should be tax free. A medium-term

solution would be to enter into joint-ventures, or fishing agreements, with neighboring countries. The long-term aim should be sustainable utilization of resources.

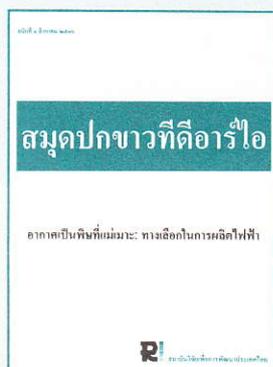
### The Effects of Restructuring of Tariffs on Electronic Parts and Their Import Procedure

This research project, contracted to TDRi's Science and Technology Development Program (STD) by the National Science and Technology Development Agency and the National Electronics and Computer Technology Center, has now been completed. Its objectives were to assess the use of electronic parts in Thailand; to pinpoint the procedures, duties, and regulations governing their import, as well as the problems encountered in import procedures; and to propose alternatives for restructuring import regulations, procedures and customs duties on electronic parts, and the pros and cons of each alternative.

### Rice 2003

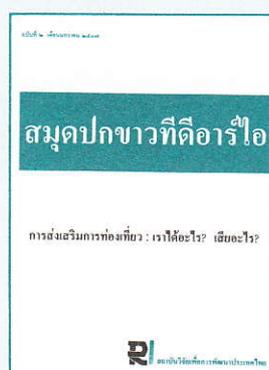
This study, conducted by TDRi's Natural Resources and Environment Program, investigated the future of the Thai rice industry and the likely trends in supply and demand until the year 2003. The study proposed guidelines for government intervention in the rice market. Financed by the Ministry of Commerce, the project took eight months to complete.

## TDRi White Paper Series



In August last year, under the auspices of the President's office, the Publications Office launched a new "White Paper" series in which the pros and cons of current issues in Thailand are put forward. So far, the Publications Office has produced two editions.

The first presented the hard facts behind the incident when air pollution at Mae Moh electricity generating plant damaged the health of more than 1,000 people, caused crop failures, and the death of untold domestic animals. Discussed among other issues in the papers was the "correct way to generate electricity."



The second edition, produced in February this year, presented facts about Thai tourism, examining such questions as: in promoting Thai tourism, what does the country gain and what does it lose? It also discusses problems presently

faced by the tourism industry, current tourist trends, and examines what future direction the tourist industry should take. Forthcoming is an edition on how drugs are transported from the Golden Triangle. Published in Thai, the White Paper costs 10 baht per copy.

### **TDRI VIDEO TAPE**

In January this year, TDRI began airing its new Thai television documentary "TDRI White Paper." Shown on Sundays at 8.35 p.m. on Channel 9, topics so far have been: air pollution at Mae Moh electricity generating plant, the tourist industry, traffic problems and solutions, Bangkok's expressways, traffic accident rates, hazardous waste treatment, and drug routes from the Golden Triangle.

Video tapes cost 250 baht each and can be obtained through TDRI's Publications Office.

The Chai Pattana Foundation and TDRI extend sincere thanks to the sponsors of our 1993 Year-End Conference. The TDRI Year-End Conferences, held in December of each year, provide a major forum for the thorough examination of a selected issue. A large-scale research effort, centered around the conference's theme, is undertaken each year. From this research TDRI then prepares a series of conference papers detailing its findings. For 1993, the theme was: Who Gets What and How?: Challenges for the Future.

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Code	Conference Papers
Y93A	“บนหนทางสู่ออนาคต,” Synthesis Report Volume I, โคนิธิ เอียวศรีวงศ์, ธันวาคม 2536, 45 หน้า. Price: ฿120.00 (US\$5) Weight: 400 grams
Y93B	“Urban Life and Urban People in Transition,” Synthesis Report Volume II, by Paritta Chalermpong Koanantakool, December 1993, 72 pp. Price: ฿170 (US\$7) Weight: 800 grams
Y93C	“Democracy Without Equity?: The Institutions and Political Consequences of Bangkok-based Development,” Synthesis Report Volume III, by Scott R. Christensen, December 1993, 60 pp. Price: ฿120 (US\$5) Weight: 800 grams
Y93D	“Social Inequity: A Source of Conflict in the Future,” Synthesis Report Volume IV, by Akin Rabibhadana, December 1993, 66 pp. Price: ฿160 (US\$7) Weight: 800 grams
Y93E	“Beyond Patronage: Tasks for the Thai State,” by Scott R. Christensen and Ammar Siamwalla, December 1993, 60 pp. Price: ฿150 (US\$6) Weight: 800 grams
Y93F	“นโยบายสังคมสำหรับประเทศไทย,” โดยสมเกียรติ วันทะนะ, ธันวาคม 2536, 51 หน้า. Price: ฿120 (US\$5) Weight: 400 grams
Y93G	“กฎหมายและการพัฒนาสังคมไทย: ใครจะได้อะไร อย่างไร?,” โดยสุรเกียรติ์ เสถียรไทย, ธันวาคม 2536, 27 หน้า. Price: ฿100 (US\$5) Weight: 400 grams
Y93H	“สังคมเศรษฐกิจไทยในทศวรรษ 2550: ยุทธศาสตร์การพัฒนาในกระแสโลกาภิวัตน์,” โดยรังสรรค์ ธนะพรพันธุ์, ธันวาคม 2536, 116 หน้า. Price: ฿220 (US\$9) Weight: 400 grams
Y93I	“Community Integration into Regional Industrial Development: A Case Study of Klong Ban Pho, Chachoengsao,” by Chantana Banpasirichote, December 1993, 64 pp. Price: ฿150 (US\$7) Weight: 800 grams
Y93J	“ผู้นำท้องถิ่นอีสานกับเครือข่ายความสัมพันธ์: กรณีศึกษาสมาชิกสภาเทศบาล,” โดยคารารัตน์ เมตตาริกานนท์, ธันวาคม 2536, 51 หน้า. Price: ฿150 (US\$6) Weight: 400 grams
Y93K	“The Making of Modern Bangkok: State, Market and People in the Shaping of the Thai Metropolis,” by Marc Askew, December 1993, 62 pp. Price: ฿150 (US\$6) Weight: 800 grams
Y93L	“The Banglamphu District: A Portrait of Change in Inner Bangkok,” by Marc Askew, December 1993, 45 pp. Price: ฿120 (US\$5) Weight: 800 grams
Y93M	“แลได้สี่ทศวรรษ: ความเปลี่ยนแปลงทางสังคม วัฒนธรรม และพัฒนาการทางการเมือง (ในช่วงเวลา 2490-2536),” โดยฉวีวรรณ ประจวบเหมาะ, ธันวาคม 2536, 253 หน้า. Price: ฿380 (US\$16) Weight: 1 kg.
Y93N	“การเปลี่ยนแปลงทางเศรษฐกิจสังคม และวัฒนธรรมของภาคอีสาน (ในช่วง 1950-1990),” โดยวิฑูรย์ จำรัสพันธุ์, ธันวาคม 2536, 102 หน้า. Price: ฿200 (US\$8) Weight: 400 grams
Y93O	“Socio-Cultural Change and Political Development in Central Thailand, 1950-1990,” by Amara Pongsapich, and Chantana Banpasirichote, Phinit Lapthananon, and Suriya Veeravongse, December 1993, 111 pp. Price: ฿280 (US\$12) Weight: 800 grams



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