Economic Survey

A strategy for the agro-industrial development of Thailand

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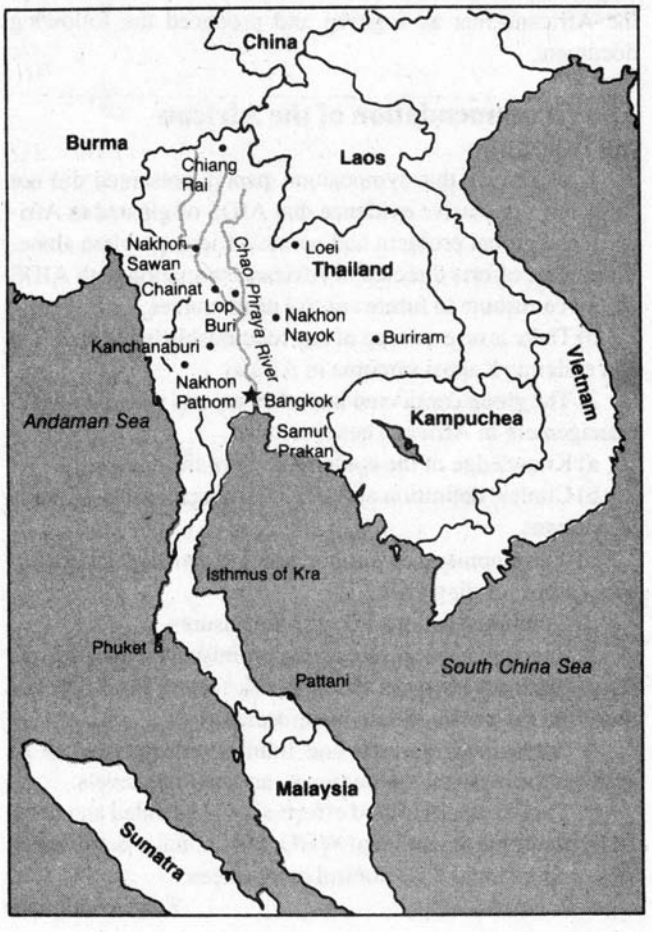
Even though economic growth has not been arrested entirely, it is generally acknowledged that Thailand's economy today faces its most severe difficulties of the past quarter century and perhaps since the post-World War II reconstruction. However, there is little or no agreement as to the precise causes of the crisis or appropriate measures to alleviate it.

Thailand's rice-producing regions



Clearly, external factors—ranging from massive oil price increases in the 1970s to the usuriously high interest rates of the past five years—have significantly contributed to the slowdown. Still, several other developing sector economies, faced with the same depressed world economic environment, have demonstrated remarkable resiliency and flexibility in coping with it; Thailand has not. There are two related sets of reasons accounting for this failure. First, the government so far has proved itself incapable of decisive action, reacting to each problem as it arises in piecemeal fashion and without any discernible underlying strategic concept. Second, the highly unfavorable external environment has revealed certain basic structural deficiencies and laid bare crass failures of past planning which only decisive strategically conceived action will be able to correct.

Decisive action in the agricultural sector has the greatest chance of success both for relieving short-term crisis conditions and for long-term "structural adjustment," decreasing the external vulnerability of the Thai economy.

The principal structural problem of agriculture in Thailand, and by implication of the Thai economy as a whole, is expansion of rice cultivation area without yield improvement. Average yields today are essentially the same as 60 (!) years ago. It is proposed to adopt a strategy of simultaneous rice-yield doubling in high-yield areas and conversion of 40-45% of rice farmland to beef and dairy cattle farming and feed grain and cash crop (cotton) cultivation. Principal areas targeted for conversion are located in the northern and northeast regions. Both yield improvement and conversion require sizable added agricultural inputs. These requirements in turn greatly increase demand for products of the fertilizer, agricultural machinery, construction, and construction equipment industries, and provide a powerful stimulus for creation of new domestic production capacities in these areas. The "structural adjustment" advocated here contrasts sharply with World Bank recommendations. Reliable domestic demand expansion rather than uncertain export opportunities is regarded as the principal force of Thailand's future economic growth.

After 25 years of rapid economic growth, Thailand today

remains basically an agricultural country. Seventy-five percent of the labor force is employed in agriculture, the degree of urbanization is among the world's lowest (urban population as percentage of total population = 18%), and agricultural product outranks all other merchandise exports. However, while dominating employment and foreign trade, agriculture's contribution to GDP (Gross Domestic Product) has shrunk from 45% in 1954 to 22% at present. Industry, on the other hand, with only 9% of the total labor force, contributes 28% of GDP. Agriculture today continues to dominate employment not because of its inherent strength and vitality, but because of its lack of productivity and because of gross negligence in overall economic planning and failure to facilitate an adequate rate of job creation in other sectors of the economy. Low-productivity agriculture is the millstone around the nation's neck and the principal barrier to successful future economic development. If not corrected soon, simple demographic calculation demonstrates that most severe social consequences must ensue. At the same time, it is equally demonstrable that a determined attack on the problem is the single most promising way of resolving the present economic crisis and of laying a sound foundation for future growth.

Historically, Thailand is a rice economy, and despite significant crop diversification in the past two decades, rice cultivation continues to dominate the agricultural sector. Thus a brief review of the pattern of rice cultivation and of average yield will provide relevant insights into the problem of the agricultural sector as a whole. It immediately reveals the danger to the economy and to the nation's future inherent in continuation of the historical trend of low-productivity expansion of cultivated area driven by strong demographic pressures. The trend is summarized in **Figure 1**.

Population, total rice production, and harvested "cultivated" area have all roughly quadrupled—with no increase in average productivity in 60 years! At 1,850 kg/hectare, average yields lag behind even those of India (2,200 kg/hectare in 1983), and are only one-third of the average yields of Korea, Japan, and the United States. Clearly, such simple linear expansion of cultivated area to provide for the livelihood of an expanding population cannot continue for long. By the year 2000, fifteen years from now, already 80,000 rai would be required to sustain the expected population of 68 million, and it simply becomes absurd to continue such projections even further into the future. Only two possible future outcomes can be reasonably projected: Either measures aimed at doubling average productivity in five to seven years will be sought and implemented, or increasing population pressure will produce mass impoverishment in rural areas combined with even further uncontrolled migration of unemployable rural labor into the already overburdened Bangkok area.

To find possible solutions to the problems summarily identified above, inspection of nationwide average productivity (yield) figures is insufficient. A province-by-province survey (**Figure 2**) reveals significant variation of yields and

FIGURE 1
Rice: production, area, and yield

	Population	Total production (1,000 metric tons)	Harvested area (1,000 rai)	Average yield (kg/rai)
1923-27	11.5	4,600	15,600	295
1983	49.2	15,700	35,300	295
			(57,600)	

Note: The population figure is for the year 1929; 57,600 rai is cultivated area.

FIGURE 2
Rice yields in 1983

Region	Yield (hg/rai)	High-yield province	Yield (kg/rai)	Low-yield province	Yield (kg/rai)
Central	368	Chainat	480	Lopburi	300
Eastern	329	Samut Prakan	400	Nakhon Nayok	300
Western	338	Nakhon Pathom	390	Kan-chanaburi	310
Northeast	239	Loei	310	Buriram	200
North	349	Chiang Rai	510	Nakhon Sawan	280
South	295	Phuket	380	Pattani	260

allows us to pinpoint the causes of the problem. The table shows the highest and lowest yield provinces in each of the country's regions as well as regional averages for 1983.

At 300 kg/rai, lowest yields in the central and northern regions are approximately the same as the highest yields achieved in the northeast. Nationwide average yields are depressed because it is precisely in the lowest-yield but large and densely populated northeast region that 46% (1983) of all rice land is located. Historically, rice farming spread out from the Chao Phraya plain, which has a highly favorable natural environment for rice cultivation, to other regions which do not. Such expansion can succeed only if it receives well-planned infrastructure back-up ranging from irrigation to electric power and transport facilities. High rice yields in the northern provinces show that significant infrastructural support was provided, primarily in the form of irrigation works carried out in the 1950s and 1960s. The northeast, on the other hand, received no comparable attention, and as a result of this gross planning and development policy failure, the nation's largest and most populous region has become the principal obstacle to sound progress for the Thai economy as a whole.

Figure 2, however, not only reveals the relative backwardness of the northeast (and to a lesser extent the southern) region. Even the relatively high rice yields in Chainat and

Chiang Rai, for example, fall well short (by 40 to 50%) of the 5,000 kg/hectare achieved in many other Asian regions. This reflects the fact that even in the higher-yield areas of Thailand, infrastructure support (irrigation, electric power), fertilizer use, and degree of mechanization remain extremely low (see **Figure 3**).

It is in the area of infrastructure development and inputs of industry-derived products into agriculture that agricultural and industrial development planning overlap. Regional planning failures mentioned above were paralleled by failures of energy and industrial planning and have cost and continue to cost the country dearly. Opportunities to make the most of Thailand's great natural agricultural endowment and of creating new significant-sized indigenous industries with open-ended domestic demand (agricultural machinery, fertilizer production, power equipment) were missed simultaneously.

The planners from Thailand's National Economic and Social Development Board (NESDB) are responsible for the welfare of a country which:

1) Has a great need for irrigation;

2) Has an equally great need for reasonably priced electrical power;

3) Has a large (over 10,000 MW) untapped hydroelectric potential; and

4) Has a need to protect its foreign exchange reserve position.

But the NESDB has failed to provide what would appear to be the obvious response to this challenge. Irrigation and hydroelectric development were largely ignored and precious dollar reserves were instead siphoned off to OPEC to purchase oil for electricity generation. The large number of highly skilled construction workers which some OPEC countries in turn employed for their own development projects might have been more profitably employed to develop Thailand's own resources.

FIGURE 3
Comparative inputs and rice yields

	Irrigated area as percentage of total cultivated area	Fertilizer use (kg/ha)	Rice yield (kg/ha)
Thailand	16	18.3	1,850
Indonesia	28	75	3,300
Korea	52	282	5,800
Japan	66	412	5,700

Note: Irrigation percentage, fertilizer use: 1980-82 figures; rice yield: 1983 figures.

FIGURE 4
Yield improvement/conversion potential

	1982	1992	2000
Population (millions)	48	59	68
Yield (kg/rai)	304	650	800
Paddy production (thousand tons)	16,709	22,000	25,000
Planted area (1,000 rai)	59,529	36,000	33,000
Harvested area (1,000 rai)	54,887	34,000	31,000
Conversion potential (1,000 rai)		23,500	26,500

What can be done?

Most of the problems we have identified should be viewed as previously passed up rather than as lost opportunities. To put the matter into positive perspective: Thailand has come a long way (measured for example in per capita income) in the past 20 years, without undertaking certain obvious economic development measures. Therefore, there exists now very significant room for improvement and rapid progress, perhaps more than in most other developing nations of the Asia-Pacific region.

The recommended development strategy can be summarized as follows:

1) Target areas best suited for rice cultivation for yield improvement of 50-60% in five to seven years.

2) As the rice-yield improvement program takes hold, phase out rice production in less suitable areas (northeast, north, south) and convert to pasture land and feedgrain production for cattle and dairy farming, and to cash crops (cotton, etc.).

3) Develop infrastructure and industrial support systems, both locally and centrally, to sustain and expand the productivity improvement and conversion program.

4) Develop "downstream" industries to feed infrastructure projects and agriculture-related industries.

5) Site new infrastructure and agriculture-related industrial projects strategically from the standpoint of developing new urban centers (urban decentralization, relief for Bangkok metropolitan area).

6) Adopt administrative measures to assist the decentralization process.

This development strategy amounts to conscious rejection of World Bank and similar development models. It rather proceeds from the historical perspective of successful development as practiced between 1850 and 1950 in the present advanced-sector nations. Stress is laid on the driving force of expanding domestic markets rather than of exports, on the productivity-producing role of infrastructure, and on the high profitability and thus internal savings and reinvestment po-

tential of capital (and energy) rather than labor-intensive development.

We elaborate here the first three of these points.

Yield improvement and conversion

The result of a close-to-optimal yield improvement/conversion potential simulation are summarized in **Figure 4.** Implementation of the rice-yield improvement and land conversion program should proceed by targeting—on the basis of a detailed province-by-province survey—high-yield (400 kg/rai plus) areas for immediate further improvement, and at the same time, provide incentives and guidance for conversion in areas targeted for phase-out. As a general rule, the central plain and certain northern areas are the best candidates for successful, short-term yield improvement, while much of the precipitation-poor northeast should be converted to beef and dairy cattle farming and cash crops (e.g., cotton to supply the textile industry; Thailand at present imports $100 million worth of cotton from the United States!)

Even by conservative estimates, a 50% yield improvement in well-suited areas and a concomitant 20 million rai conversion potential should be achievable by 1992.

Input requirements

Input requirements for yield improvement and successful conversion—i.e., water, fertilizer, rodenticides and insecticides, electricity, mechanization—have been computed on the basis of standard inputs/yield correlations for the relevant ranges of climatic conditions. Investment costs for the delivery of the required input quantities vary greatly with local conditions and have to be computed on a project-by-project basis. Our simulation employed selected historical averages for Thailand corrected for inflation and technological improvements.

The need for increased irrigation, especially dry-season irrigation, and increased fertilizer use dominate all other input requirements. Increased electricity generation and rural electrification are the most important derivative requirements, since dry-season irrigation must employ pumping on a significant scale. Irrigation, fertilizer, and electricity requirements are summarized in **Figure 5.**

Irrigation and fertilizer requirements in the table refer only to the rice-yield improvement program; rural electricity consumption projections cover total national requirements. To derive return of investment estimates for the areas targeted for conversion, we also assume the irrigation percentages and fertilizer use for these areas that are shown in **Figure 6.**

Thus, not counting cultivated areas of Thailand not covered by this analysis, we require roughly a doubling of irrigated area and a five-fold increase in fertilizer (plant nutrient) over 1982 levels. In addition, to assure essentially full rural electrification by 1990 and no slowdown of development due to electric power shortages, requires installation of about

FIGURE 5
Selected input requirements

	1982	1992	2000
Irrigated paddy area as % of total paddy area	33	80	95
Fertilizer use (100 g of nutrients/ha)	183 (300)[1]	1,500	2,200
Rural electricity consumption (millions of kwh)	5,894[2]	23,000	48,000

[1]Estimate for above-average-yield paddy areas
[2]1981

FIGURE 6
Inputs for conversion areas

	1982	1992	2000
Irrigation percentage	5	25	35
Fertilizer use (100 g of nutrients/ha)	125	1,200	1,800

FIGURE 7
Added inputs (absolute values)

	1992	2000
Added irrigated area (1,000 rai)	+ 16,000	+ 22,000
Added fertilizer (nutrient) consumption (1,000 metric tons)	+ 953	+ 1,562

4,500 MW of capacity by 1992 and 10,500 MW by 2000, over 1981 capacities, dedicated to rural power supply.

All these are significant, but by no means extravagant or unmanageable requirements. Every effort should be made to meet the added electric power demand from domestic resources—principally through rapid development of the remaining hydro potential, lignite and natural gas—and, we strongly recommend, at least two nuclear power plants. Hydroelectric development can be combined with water control and storage for irrigation, especially in the northeast region. Further irrigation in the central plain will have to rely increasingly on ground-water exploitation. Lastly, the greatly expanded fertilizer demand (as well as the demand for added farm mechanization not covered in our analysis) will provide powerful incentives for development of relatively large-scale domestic production capacities in these agriculture-support industries.