



Development Progress



Thailand's progress in agriculture:

Transition and sustained productivity growth

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List of abbreviations

BAAC	Bank for Agriculture and Agricultural Cooperatives
CIAT	Centro Internacional de Agricultura Tropical (International Centre for Tropical Agriculture)
CIES	Centre for International Economic Studies
EU	European Union
FAO	Food and Agriculture Organization
FTA	Free Trade Agreement
GDP	Gross Domestic Product
GIEWS	Global Information and Early Warning System
MDG	Millennium Development Goal
NESDB	National Economic and Social Development Board
NSO	National Statistical Office
OECD	Organisation for Economic Co-operation and Development
SD	Standard Deviation
TDRI	Thailand Development Research Institute
US	United States
USAID	US Agency for International Development
WDI	World Development Indicators
WHO	World Health Organization

1. Introduction

Thailand has been successful in its agricultural development. During the past half century, the country has undergone much of the transition from a rural agrarian to an urban and industrial economy, with high growth rates and major reductions in poverty and hunger. While, as expected, agriculture has declined in relative importance, Thailand has become an Asian New Zealand: a leading agricultural exporter, able to produce a range of tropical produce at costs as low as any in the world.

Thailand is a prime example of successful agriculture development in an industrialising country. This paper reviews the experience over the past 40 years and draws out policy lessons.

2. Context

Thailand was never colonised. The revolution of 1932 turned the regime from an absolute into a constitutional monarchy. Since then, political power oscillated from a military to bureaucratic elite, with the support of influential businesspersons and entrepreneurs. From 1960 until 1981, the military dominated, and the regime was supported by the US as a barrier against communist progress in the region. The US provided heavy investment support during this period. For most of the 1980s, Thailand was ruled by Prem Tinsulanonda, a democratically inclined strongman who restored parliamentary politics. After a short military interlude in 1991, a similar dynamic continued until the 1997 crisis. After the turbulence of the post-crisis period, Thaksin Shinawatra, the media tycoon leader of the Populist Party, became Prime Minister in 2001. He built support from the working and rural classes, who rewarded him for generous social and economic welfare programmes. Yet, he was accused of corruption and electoral fraud, and was overthrown in 2006 by a military coup. Since then, opposition between Thaksin's party and its rural-based support and the ruling party (the People Power Party) has turned into several episodes of violent protest and confrontation.

Despite political instability and limited accountability of successive Thai regimes, the economic transition from an agrarian to an industrialised economy accelerated in the 1960s and never discontinued. While agriculture was still the engine of growth until the early 1980s, the economy and industrialisation progressed particularly quickly in the 1980s and until the 1997 economic crisis. By 2007, the economy had become dominated by services and industry. Yet, agriculture still occupied around 50% of the active population and contributed 10% of Thai gross domestic product (GDP).¹

Thailand has a total land area of 51.31 million ha. Some 40% of Thai land is agricultural, largely allocated to crops, the main ones being rice (nearly 60% of the cultivated area), maize, cassava, sugar cane and palm oil. Fisheries are also important, with shrimps in particular a major export. With a population of more than 63 million (2008) Thailand has more than 0.3 ha of agricultural land per person, close to the world median but considerably more than in most Asian countries.

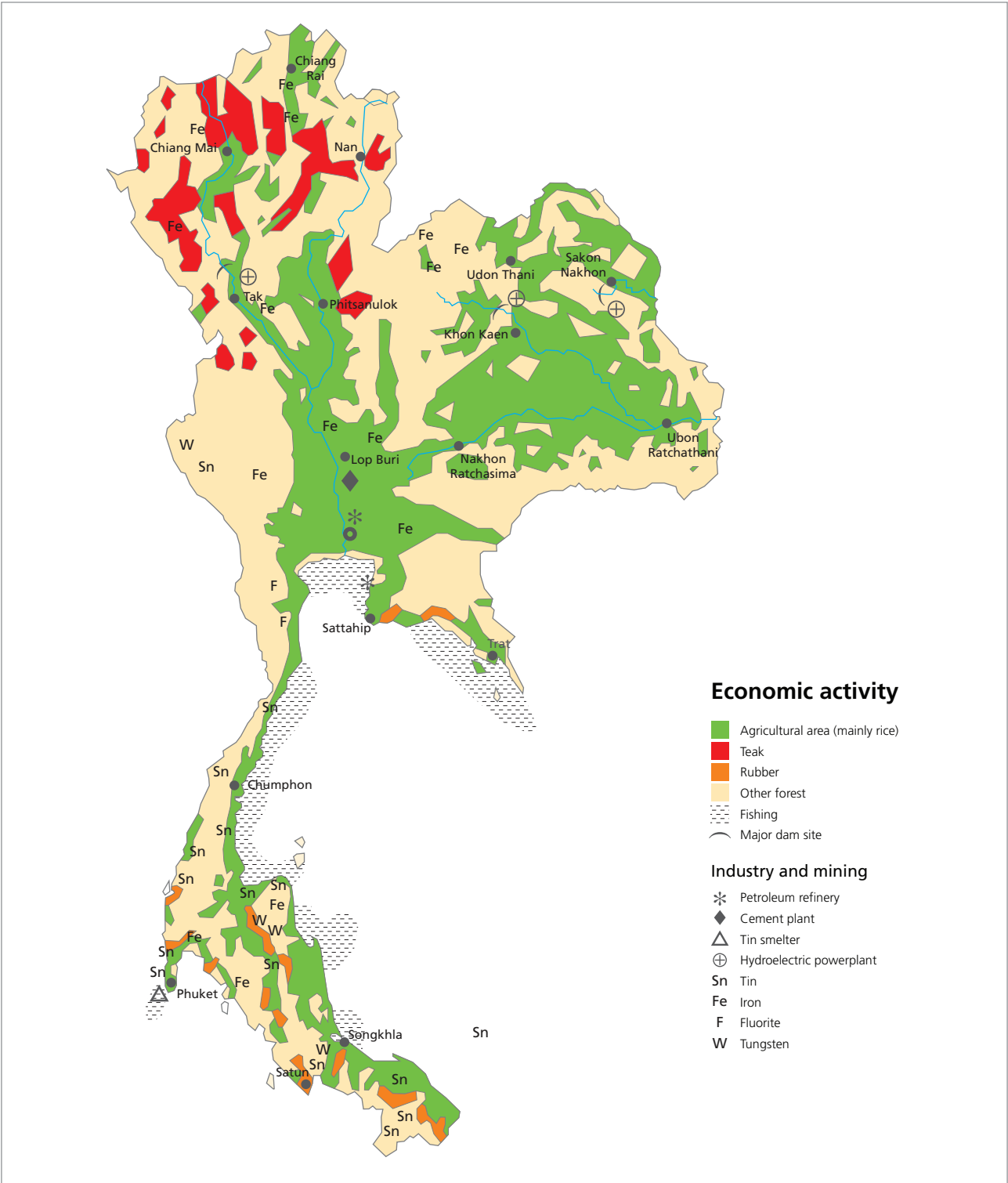
2.1 Geography of Thai agriculture

Most of Thailand has high rainfall, but topography, access to the coast, spread of rainfall over the year and soil quality vary markedly across the country:

- Central region: The historical rice basket of the country, with much irrigated land, where commercial agriculture first developed. The centre has high agricultural productivity but the lowest share of agriculture in its economy.
- Northern region: Low population density and mountainous. Smaller landholding, with a large proportion of farmer specialised in high-value crops such as fruits and vegetables.
- Northeast region: The most agricultural region, where almost half of Thai farmers live. Agro-ecological conditions are less favourable than elsewhere, and it is relatively remote from the coast and the main urban centres. This partly explains why this region experiences the lowest agricultural productivity of the country and the highest incidence of rural poverty.
- Southern region: Low density and very suitable agro-ecological conditions, with rainfall spread all over the year. The south is by far the most important region for rubber production, the first agricultural export of the country in terms of value.

Figure 1 and Tables 1 and 2 illustrate these regional differences.

Figure 1: Economic activity in Thailand, 2003



Source: Agricultural Census 2003.

Table 1: Land use and land tenure by region, 2003

Item	Total	Central	North	Northeast	South
Land use	100.0	100.0	100.0	100.0	100.0
Rice	52.9	42.8	53.5	69.6	9.9
Para rubber	8.9	4.3	0.1	1.1	57.0
Permanent crops	10.5	15.7	11.7	2.7	27.4
Field crops	18.5	25.0	27.6	16.7	0.2
Vegetable crops, herbs, flowers and ornamental plants	1.4	3.0	2.1	0.6	0.4
Forest (planted)	1.0	0.8	0.9	1.3	0.3
Pasture	1.0	0.8	0.9	1.3	0.3
Pen	0.9	1.0	0.8	1.1	0.6
Fresh water culture	1.1	3.5	0.5	0.6	0.2
Other	4.2	3.2	2.1	5.7	3.9
Land tenure	100.0	100.0	100.0	100.0	100.0
Own land	75.9	56.2	64.1	84.3	95.5
Other	24.1	43.8	35.9	15.7	4.5

Source: Agricultural Census 2003.

Table 2: Number and area of holding by region, 2003

Region	Number of holdings		Area of holding (rai)		Average area per holding (rai)
	No.	%	Area (rai)	%	
Total	5,792,519	100.0	114,460,932	100.0	19.8
Central	901,027	15.6	21,869,432	19.1	24.3
North	1,367	702	23.6	25,346,792	18.5
Northeast	2,640,866	45.6	51,935,157	45.4	19.7
South	882,924	15.2	15,309,551	13.4	17.3

Note: 1 rai = 40m x 40m = 0.16 ha.

Source: Agricultural Census 2003.

2.2 An industrialising country

Thailand is a middle-income country that has been making the transition from being largely rural and agrarian to being urban and industrialised since the 1960s. Table 3 shows how industry, and manufacturing in particular, has been increasing its share of output.

Table 3: Structure of the Thai economy, 1960-2007

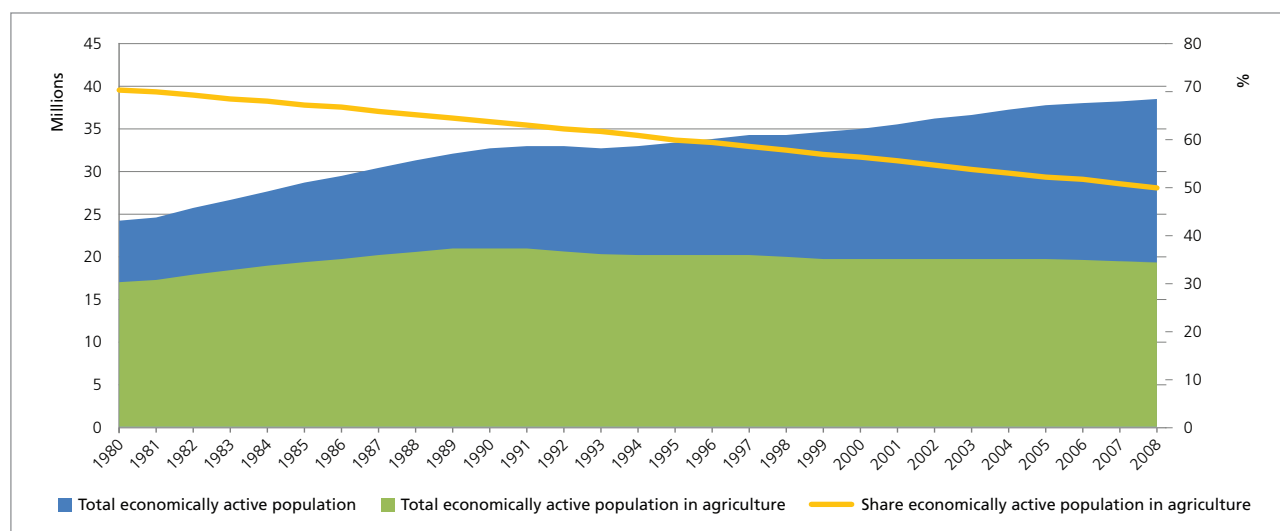
Sector and variable	1960	1980	1990	2000	2007
Agriculture, value added (% of GDP)	36.4	23.2	12.5	9.0	10.7
Industry, value added (% of GDP)	18.5	28.7	37.2	42.0	44.7
Employment in industry (% of total employment)	X	10.3	13.6	17.9	20.7
Manufacturing, value added (% of GDP)	12.5	21.5	27.2	33.6	35.6
Services, etc, value added (% of GDP)	45.0	48.1	50.3	49.0	44.6

Source: WDI.

In the meantime, the share of the population working on the land declined from 70% in 1960 to around 50% in 2007. Since the early 1990s, not only has the share of the labour force occupied in agriculture fallen, but also absolute numbers have declined (Figure 2). Ageing farmers and workers are no longer fully replaced. Nevertheless, the country has managed to keep sufficient agricultural growth to feed a fast-growing population while successfully exporting rice, cassava and some higher-value tropical products such as pineapples, rubber and shrimps. Indeed, so competitive are some Thai agricultural exports that they define the lowest cost production in the world.

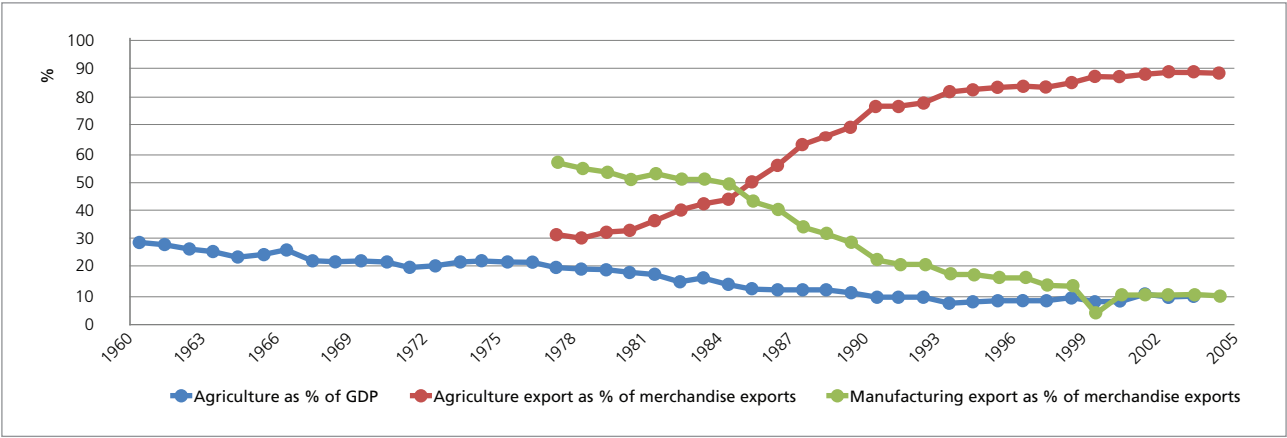
Since the 19th century, Thailand has been an important agricultural exporter. Until recently, the contribution of agriculture to Thai exports was much higher than its share in the economy (Figure 3).

Figure 2: Agriculture's declining share of the work force, 1980-2008



Source: FAOSTAT dataset.

Figure 3: Shares of agricultural value added and exports, 1960-2005



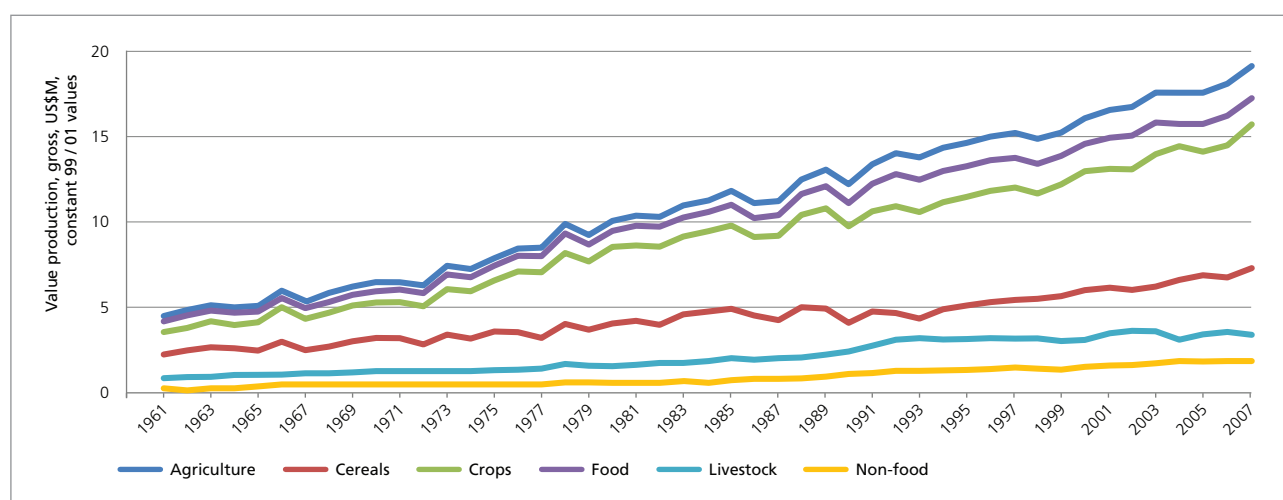
Source: NESDB, in Poapongsakorn (200).

3. What has been achieved

3.1 Overall agricultural growth

Since the early 1960s, Thai agricultural output has grown at an annual average of more than 3% a year, comfortably ahead of population growth (Figure 4).

Figure 4: Growth of Thai agriculture, 1961-2007



Source: FAOSTAT data.

Growth has taken place in stages:

- **Until 1980: Rapid agricultural growth, based on using more land and labour.** From 1960 to 1980, annual growth in agricultural production averaged above 4%. Growth occurred mostly through agricultural land expansion and rapid growth in the rural population during the demographic transition. Although land and labour productivity rose slowly, agriculture provided the rest of the economy with resources at a time when Thailand was industrialising.
- **1980-1996: Slower agricultural growth in times of economic boom.** The Thai economy grew quickly, driven mostly by manufacturing, which increased at around 10% of the annual average. Agriculture grew more slowly, owing partly to low world prices. The income gap between agriculture and other sectors of the economy widened, and many left agriculture to find jobs in manufacturing or services.
- **1997-1998: Agriculture resisted the crisis better than the other sectors of the economy.** In 1996, economic crisis broke, leading to two years of recession. The crisis affected agriculture relatively less, as the sector was largely export-oriented, and as domestic food consumption declined less than consumption of other goods and services. Agriculture thus offered a safety net to many rural households.
- **Since 1999: A new pattern of agriculture growth – intensification.** After the end of the crisis, agriculture grew again, almost as quickly as services, benefiting in recent years from the world commodity boom. The new pattern of growth is different from that prior to 1980, being based on intensification, specialisation and connection to higher-value markets.

3.2 Growth in selected crops: Rice, natural rubber, sugar cane and cassava

Thai agriculture has become quite diversified. This section focuses on some of the key production: rice, rubber, sugar cane and cassava. These few case studies illustrate some of the main driving factors behind agricultural growth in Thailand: international markets, a dynamic agribusiness and adapted economic and agricultural policies.

3.2.1 Rice

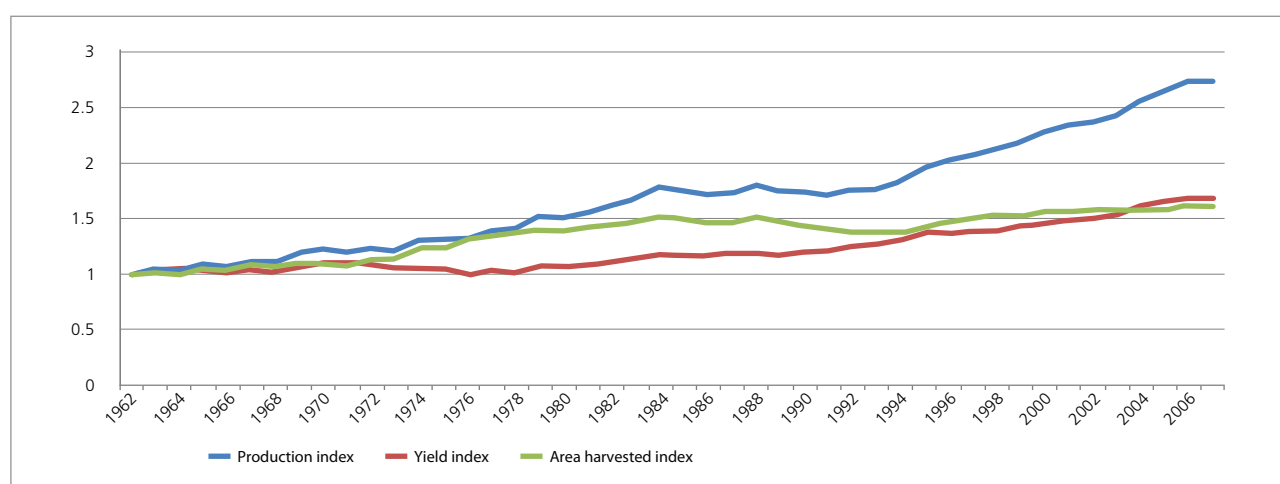
Rice is the most important crop in Thailand, taking up over 50% of arable area. Given its natural advantages related to ideal agro-ecological conditions and availability of land and irrigation, Thailand was for a long time able both to tax rice and to become the world's leading exporter. In 2007, 8.3 million tonnes of rice were exported, out of 31 million tonnes produced by Thai farmers.²

Taxes on rice were reduced in the 1980s, to maintain competitiveness when world prices fell, but also because industrialisation of the Thai economy had made substantial progress. Revenues from rice exports were no longer critical to the development of the rest of the economy, and the income gap between rice farmers and others was widening (Poapongsakorn, 2006). Rice producers actually became protected by a state-guaranteed minimal price. Not that rice production is subsidised permanently, since the intervention price usually lies below market price (Warr and Kohpaiboon, 2007).

Growth in rice production happened mostly as a result of area expansion up to the early 1980s (Figure 5), but was also stimulated by public investments in irrigation (Falvey, 2000; Isvilanonda and Bunyasiri, 2009). In the 1980s and 1990s, low prices triggered a movement out of rice farming. Areas under harvest declined, with least productive rice farmers investing in other sectors (Poapongsakorn, 2006). Intensification and mechanisation by remaining producers accompanied this move. After the end of the Asian crises, and with higher prices, this movement amplified.

For example, surveys in villages in the central and northeast regions showed the adoption of modern varieties had reached 76% in 2004, up from 26% in 1984 (Cherdchuchai and Otsuka, 2006). Recent intensification of rice production has led to increasing yields (Figure 5), which are now the more important element of production growth. Rice production still could raise yields, and can respond rapidly to growing demand. Indeed, Thailand responded quickly to price incentives in 2008/09.

Figure 5: Trends in rice production and taxation, 1962-2007



Source: FAOSTAT data.

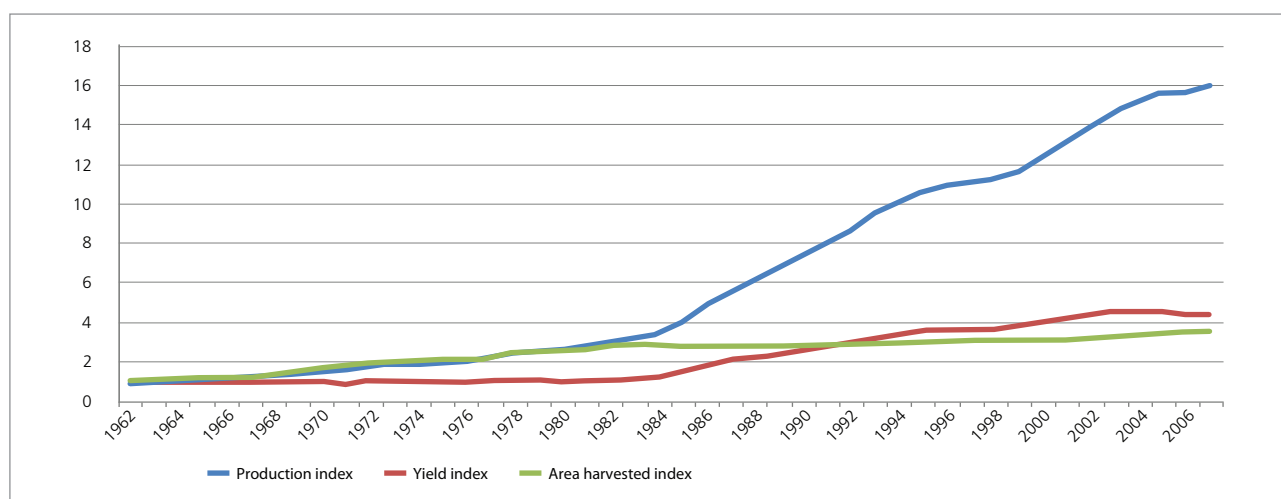
3.2.2 Rubber

Since 1991, Thailand has taken over from Malaysia as the world's leading rubber producer and exporter, by raising productivity, using improved varieties and reducing taxation.

Southern Thailand has a monsoon climate, which is highly conducive to rubber tree cultivation and helps rubber farmers achieve high yields — roughly 1.76 tons of rubber per hectare. Yields have risen since the early 1980s, thanks to promotion of improved varieties (Poapongsakorn, 2006). Most rubber comes from small farms. In 2007, Thailand was the source of over 3 million tonnes of natural rubber. Production has grown at above 7% annually since the early 1980s.

Nearly 90% of Thailand's natural rubber production is for export. In 2007, the country exported over 2.8 million tonnes, worth an estimated \$5.41 billion (170% of the value of rice exports). The top five recipients of Thailand's rubber products, in terms of export values for 2006, were China, Japan, Malaysia, the US and South Korea. Forecasts for future growth are quite good.

Figure 6: Trends in rubber production and taxation, 1962-2007



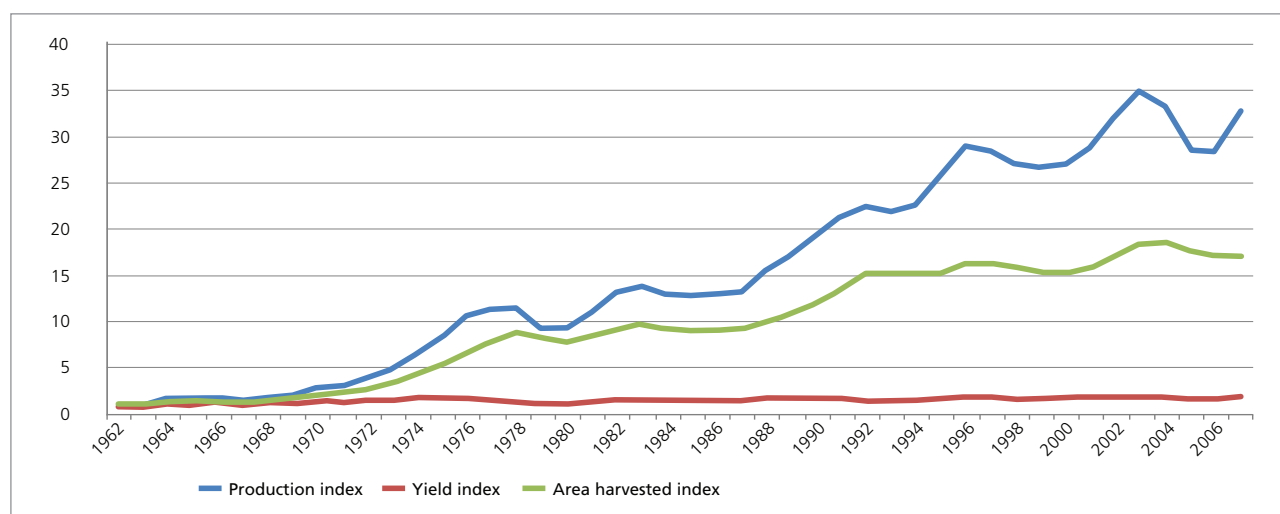
Source: FAOSTAT data.

3.2.3 Sugar

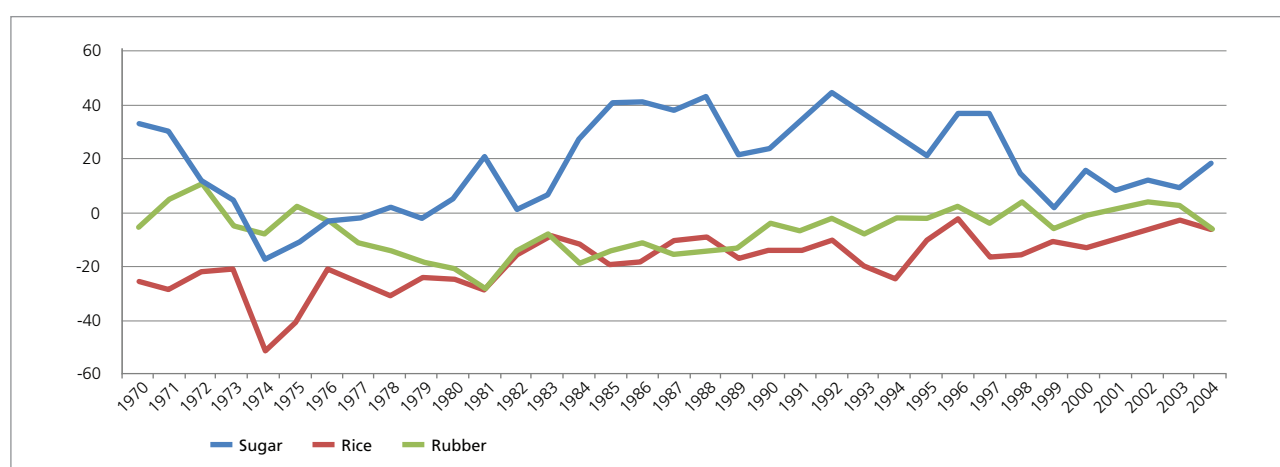
In discussions of agricultural trade policy, the sugar industry is often an outlier in terms of the treatment it receives. Thailand is no exception. Thailand has exported sugar since the 1950s, but its sugar industry receives protection in the form of a 'home price scheme,' which sets prices higher than the world market price (see positive nominal rate of assistance for sugar in Figure 8). Revenues from consumers are then used to subsidise exports.

The oddity of public subsidies to sugar production is attributed to the political power of the Thai sugar industry (Warr and Kohpaiboon, 2007). Growers and millers have bickered over prices, but they have been able to combine their efforts to lobby the government for intervention on their behalf, something other agricultural export industries in Thailand have been unable to achieve.

Growth of sugar cane is still largely based on expansion of areas under harvest (Figure 7).

Figure 7: Trends in sugar cane production and taxation, 1962-2007

Source: FAOSTAT data.

Figure 8: Nominal rates of assistance to rice, rubber and sugar, 1970-2004

Source: FAOSTAT.

3.2.4 The northeast's cassava boom

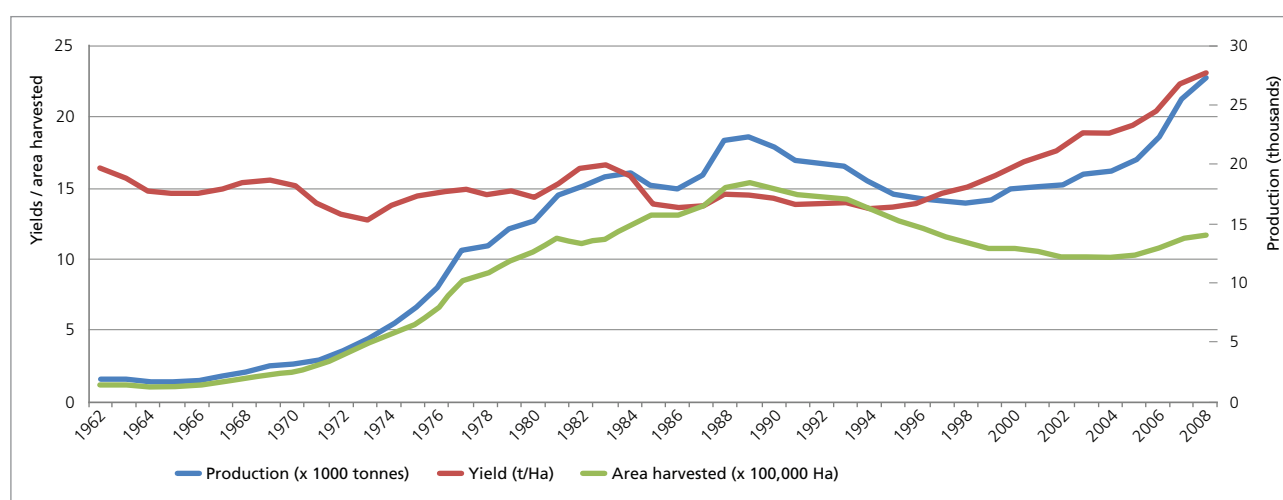
The northeast has lagged behind other regions, hampered by its distance from the main cities and only modestly endowed with natural resources. The soils are sandy and of modest fertility, and one-quarter of the area is saline. Although it rains as much as 1,300mm per year, the rainfall is highly seasonal and erratic. The northeast is more agricultural than other parts of the country: in 2004, almost 90% of rural households were involved in agriculture, against 62-75% in other regions. The share of agriculture in regional GDP is twice as high as the national average, and half of Thai farmers live in the northeast. Poverty, and rural poverty in particular, is much more widespread in the region: in 2002, rural poverty incidence was around 19% in the northeast, against 11% in the north, 8% in the south and less than 5% in the central region (NESDB and World Bank, 2005).

However, from the mid-1970s, cassava for animal feed started to develop in the region, mostly for export. In 2008, around 27 million tonnes were produced, against 1.65 million in 1962 (Figure 9). The northeast now accounts for 80% of cassava production of the country (World Bank, 2009): in 2002, more than 15% of the farmers of the region were cassava producers. Five factors can explain successful expansion of cassava production in the 1970s and 1980s (ibid):

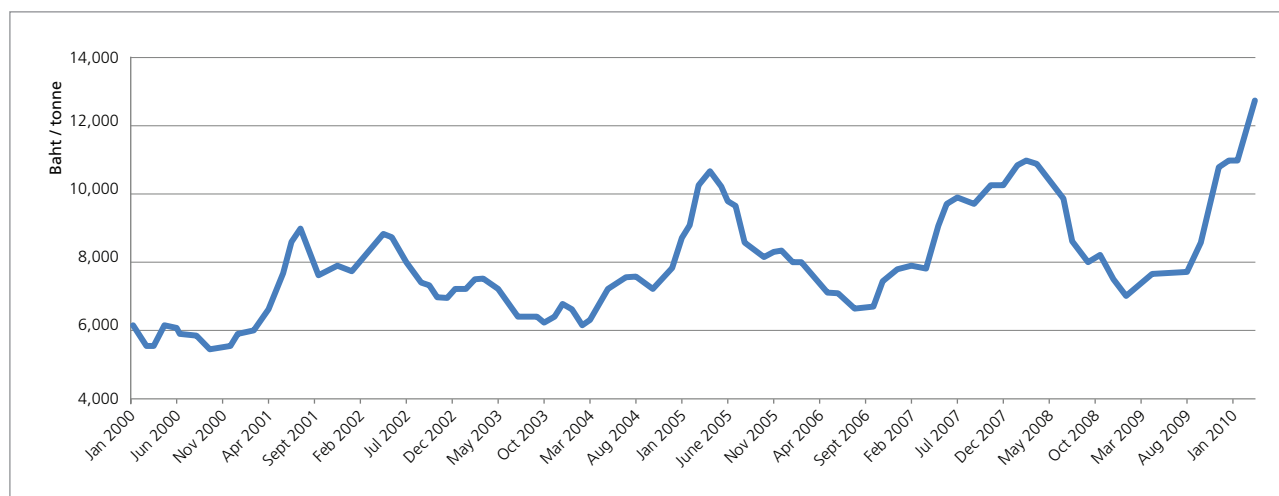
1. Opportunity to export to the European market:
'During the 1970s, trade and agricultural policies in the European Union (EU) drove up the prices of cereals in EU markets; when many European livestock producers turned to cassava as a low-cost feed substitute, international prices for cassava soared (Hershey et al. 2001). Up until 1980, Thai cassava chips and pellets used for feed could be imported into the EU free from tariffs or quotas, and after 1980 they continued to benefit from favorable tariff treatment up to a voluntary export quota limit' (World Bank, 2009:48).
2. Land availability, much of it forest, to expand the cultivated area.
3. Roads, built partly for strategic reasons, linking the region to main centres and ports.
4. Research in Thailand, supported by the Centro Internacional de Agricultura Tropical (CIAT, or International Centre for Tropical Agriculture), producing appropriate varieties and techniques.
5. Private sector initiative:
'The private sector included resourceful local traders capable of organizing plot consolidation among farmers to permit increased mechanization and efficiency in planting and production (Hershey et al., 2001)' (World Bank, 2009: 49).

The area under cassava nevertheless decreased in the 1990s, as stagnating root prices and increasing labour costs reduced profitability. In the past decade, however, Thai farmers have responded quickly to restored price incentives (Figure 10), following domestic investments in ethanol production and Chinese demand. In contrast with the 1970-1990 period, when production was raised by expanding the cultivated area, production has grown mostly through yield increases.

Figure 9: Cassava production, 1962-2008



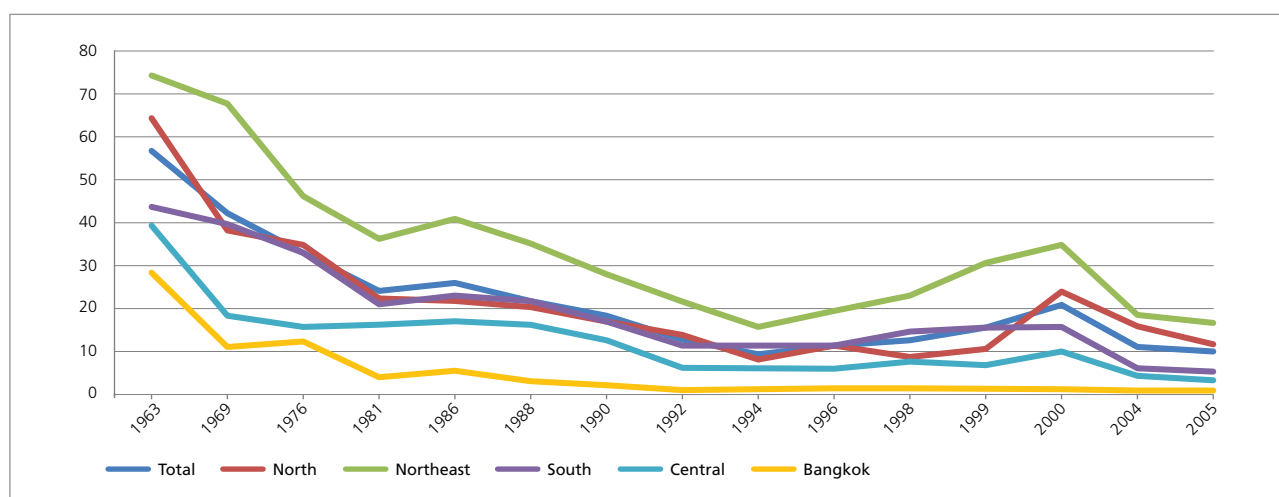
Source: FAOSTAT.

Figure 10: Cassava flour wholesale prices (constant), Jan 2000-Jan 2010

Source: FAO GIEWS – www.fao.org/giews/pricetool/.

3.3 Rural poverty reduction

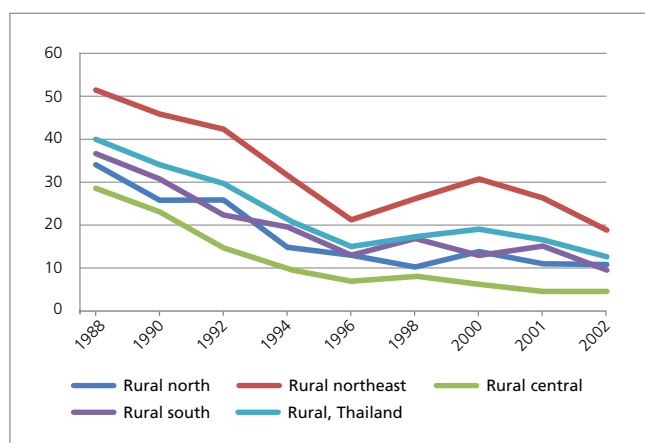
Poverty has reduced dramatically in Thailand since the early 1960s, with a brief reversal during the 1996-1998 economic crisis (Figure 11). Nationally speaking, poverty that affected 57% of the population in 1963 had fallen to under 10% by 2005. Although some areas are poorer than others, major reductions in poverty can be seen across all regions.

Figure 11: Poverty in Thailand, as a proportion of those living in poverty, 1963-2005

Sources: Statistics compiled by J. Rigg from following sources: Krongkaew (1993); Krongkaew et al. (1992; 2006); Paitoonpong (1999); Warr (2000; 2004); World Bank (1999a; 1999b; 2000a; 2000b); and Zepeda (2004).

Rural poverty has also fallen (Figure 12), by about the same degree as for the country as a whole. Again, reductions can be seen across the different regions.

Figure 12: Rural poverty in Thailand, as a proportion of the rural population living in poverty, 1988-2002



Source: NESDB data.

Overall, economic growth and industrialisation and rural-urban migration have been the most powerful drivers of poverty reduction (Deolalikar, 2002; Poapongsakorn, 2006).

Export agriculture has played an important role: it has provided the resources to support growth (at least until the early 1980s, when agriculture was taxed); it has supplied cheap food to the urban worker (Thailand is just about the lowest-cost producer of rice in the world); it has offered the basis for a dynamic and labour-intensive agro-processing industry; and it has fuelled the development of the rural non-food economy (Watanabe et al., 2009). The development of cassava production for export in the northeast region, the poorest and most agricultural area of the country, is a regional example of these combined effects of agricultural growth on poverty reduction.

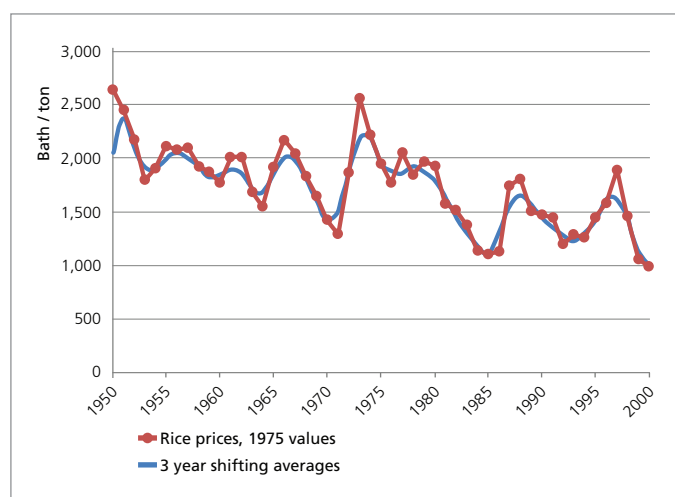
Through a multiple regression analysis, Fan et al. (2004) established that agricultural labour productivity growth, growth in non-farm employment and changes in agricultural prices were the three most important factors in rural poverty reduction in Thailand. For every 1% growth in agricultural production, rural poverty is reduced by 0.4%; in Thailand, most farmers are net food sellers, so higher food prices tend to reduce rural poverty. Perhaps even more striking is that 1% of non-farm employment growth reduces poverty by 1%. Income diversification and the development of the non-farm economy have therefore been important. Taking the case of the northeast, 66% of incomes came from the farm in 1986, higher than in any other region; by 2004, this had fallen to 38%, lower than in any other region (Poapongsakorn, 2006).

3.4 Food supply and nutrition

3.4.1 Better access to food

Thai agriculture has contributed very successfully to reducing the real price of food. Figure 13 shows the declining real price of rice, by far the most important staple of the country.

Figure 13: Real prices of rice, domestic market, 1950-2000



Source: Barker and Molle (2004).

From 1988 to 2007, the number of households affected by food poverty³ declined from 2.55 million to 418,000 (Isvilanonda and Bunyasiri, 2009). Food poverty almost disappeared from urban areas (fewer than 11,000 households in 2007, accounting for 0.7% of non-agriculture urban households). In rural areas, food poverty is greatest among households owning small farms, compared with those renting or owning larger land. Rice farmers are more often food-poor than those involved primarily in other production.

3.4.2 Significant reduction of malnutrition

The Millennium Development Goal (MDG) target of halving malnutrition (underweight infants) against the 1990 level was achieved by 2004. Stunting trends, although a bit more stubborn, are also very encouraging (see Table 4). According to Thailand's 2004 MDG monitoring report (NESDB and UN, 2004), significant progress has also been achieved in the poorest and remotest areas.

Food availability and accessibility are not limiting factors for the large majority of Thai households, so it is not surprising to see that national levels of undernourishment – a measure of access to food – had fallen to just 2.5% in 2002. Hence, remaining levels of child malnutrition are a result of lack of knowledge and nutrition education (NESDB and UN, 2004), and probably ill-health of some young children.

³. The official food poverty line for Thailand is defined as the amount of money each household needs to buy foods that give exactly the minimum amount of calories and protein (Jitsuchon et al., 2004, in Isvilanonda and Bunyasiri, 2009).

Table 4: Child malnutrition trends, 1987-2006

	1987	1993	1995	2006
Child underweight (% under-5 children below 2SD of weight for height reference)	17.4	7.3	6.7	4.7
Child stunting (% under-5 children below 2SD of height for age reference)	25.3	21.1	18.1	15.7

Note: SD = standard deviation.

Source: FAOSTAT (for 1987); WHO data (for other years).

3.5 Sustainability

The economic sustainability of Thai agriculture has been remarkable, and this is the heart of this story of progress: Thai farms, many of them small to medium scale, transformed into market-oriented enterprises. Thai agriculture is among the lead exporters for several world-traded commodities, and its competitiveness is solid for a number of these (e.g. rubber, shrimps, cassava).

Environmental sustainability is a more important concern. Agricultural land expansion has ceased since the mid-1990s, and natural areas are now better protected. The challenge now is to preserve the quality of agricultural land, as well as that of water resources. Fifteen years ago, greater use of fertiliser was needed to preserve soil quality (Moncharoen et al., 2001). Now, increasingly intensive use of fertilisers and pesticides could become a threat to the environment, but until recently there has been only anecdotal evidence that this has been the case (Poapongsakorn, 2006). With higher land availability per capita and lower yields than in most neighbouring countries, Thailand looks better placed to address the challenge of producing more with more careful use of inputs.

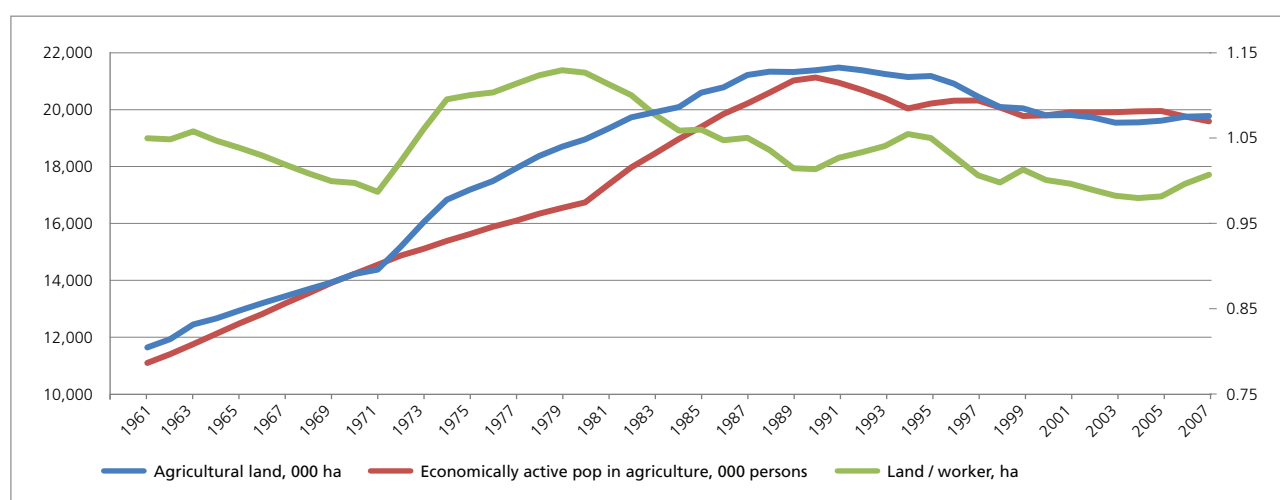
4. Drivers of progress

From the 1970s to 1990 and later, Thai agriculture experienced a transition from labour- and land-based growth to a capital- and inputs-based growth. This section describes this transition and details the main factors that supported it.

4.1 Changes in agricultural productivity

Thai agriculture grew in the 1960s and 1970s by putting underused land and rural labour to work (Krongkaew, 1985; Poapongsakorn, 2006), with forests being cleared and converted to fields and deploying more labour. However, because of a growing agricultural population, the increase in area has meant the area of agricultural land per worker has varied little over time – at between 0.95 and 1.1 ha (Figure 14).

Figure 14: Land and labour in Thai agriculture, 1961-2007



Note: Agricultural labour force prior to 1980 estimated by taking 49% of the rural population, the proportion seen in 1980. This proportion has varied subsequently in the range between 44% and 53%.

Source: FAOSTAT data.

In the 1960s and 1970s, forest clearance was more or less encouraged by a government that needed agricultural growth and an outlet for the rapidly expanding population (death rates had fallen sharply under the impact of malaria eradication). In some cases, the government encouraged forest clearance because it provided cover for communist insurgents. By the 1990s, only 10-15% of the country was under forest cover, while 1 million families were squatting inside the boundaries of the forest reserves.

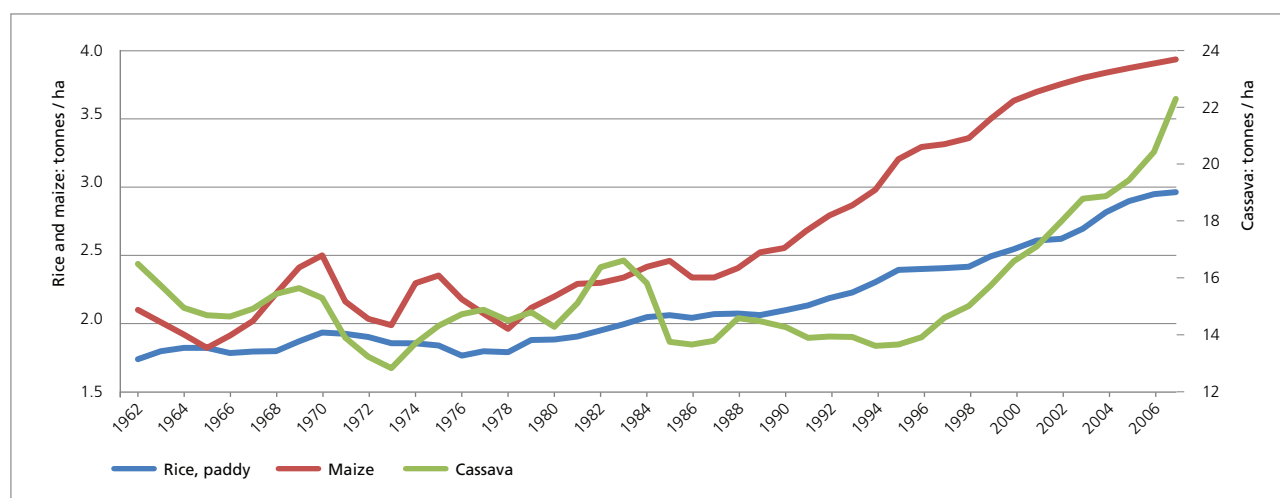
The area under irrigation also grew during this period. Most of Thailand's irrigated land is concentrated in the central plain. This region has almost half of the national total, although arable land in the region accounts for only a quarter of total arable land. Therefore, more than 60% of the arable land in the central plain is irrigated, compared with 13% in the northeast, 34% in the north and 22% in the south. The 1970s saw a further increase in irrigated area, which almost doubled, from 1.7 million ha in 1970 to 3.1 million ha in 1980; a further expansion of 1.3 million ha occurred in the 1990s. Since the 1990s, the increase has been marginal. The percentage of irrigated area in relation to total arable area increased from 15% in 1970 to 30% in 2000 (Fan et al., 2004).

Investment focused on large-scale infrastructure up until the 1990 but, owing to high investment costs, long gestation periods and low rates of return, investment has more recently shifted towards small-scale projects (Isvilanonda and Bunyasiri, 2009). Despite a significant expansion in area under irrigation, systems remain largely inefficient, and expansion has contributed only a small share of agricultural productivity growth (Fan et al., 2004).

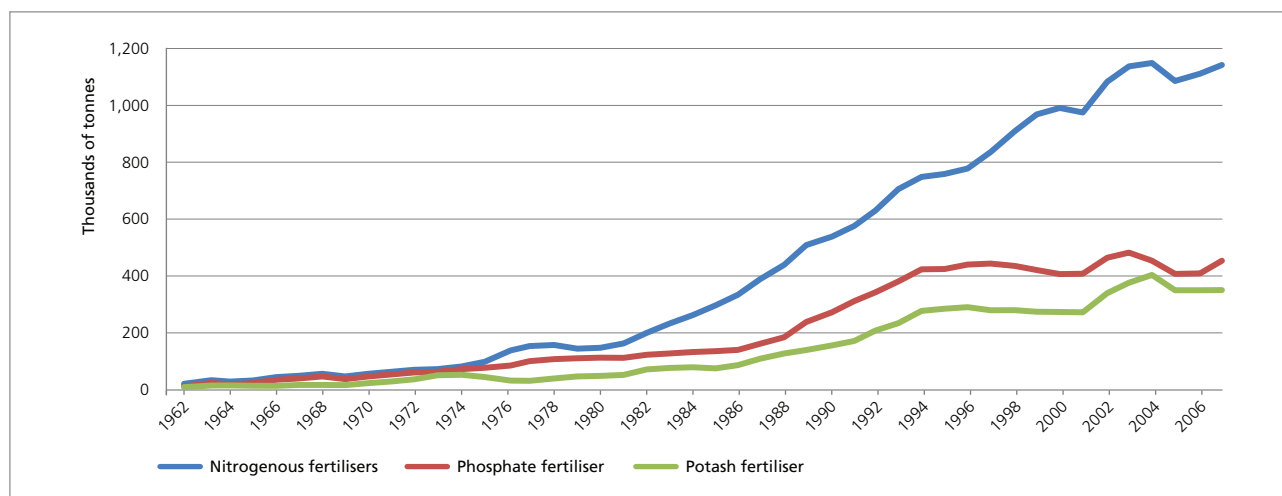
International aid generated significant support to infrastructure and irrigation investments, particularly in the northeast, pursuing connected development and security agendas after the Vietnam War. The US, Japan and the World Bank were by far the largest donors. Foreign aid for agriculture and rural development then declined in the 1980s and the 1990s.

By the late 1980s, additions to both labour and land in agriculture came to a halt: both the numbers employed and the area under cultivation have declined since the early 1990s. Less forest land remained to be cleared, and the government was increasingly taking measures to protect what remained. Agriculture could also no longer rely on a large and cheap labour force, as manufacturing and urban services competed for labour. Hence, output growth since then has come from productivity improvements. After decades of agricultural growth driven by agricultural land expansion, with few changes in land productivity, important yield growth started in the mid-1980s (Figure 15), most impressively for cassava, for which yields have almost doubled since 1996. Although agriculture research has been instrumental in rising yields, through varietal improvement in particular, greater use of fertilisers has also played an important role in driving yields up in recent decades. For example, use of nitrogenous fertilisers has multiplied almost 10-fold since 1980 (Figure 16).

Figure 15: Yields of selected crops, 1962-2007



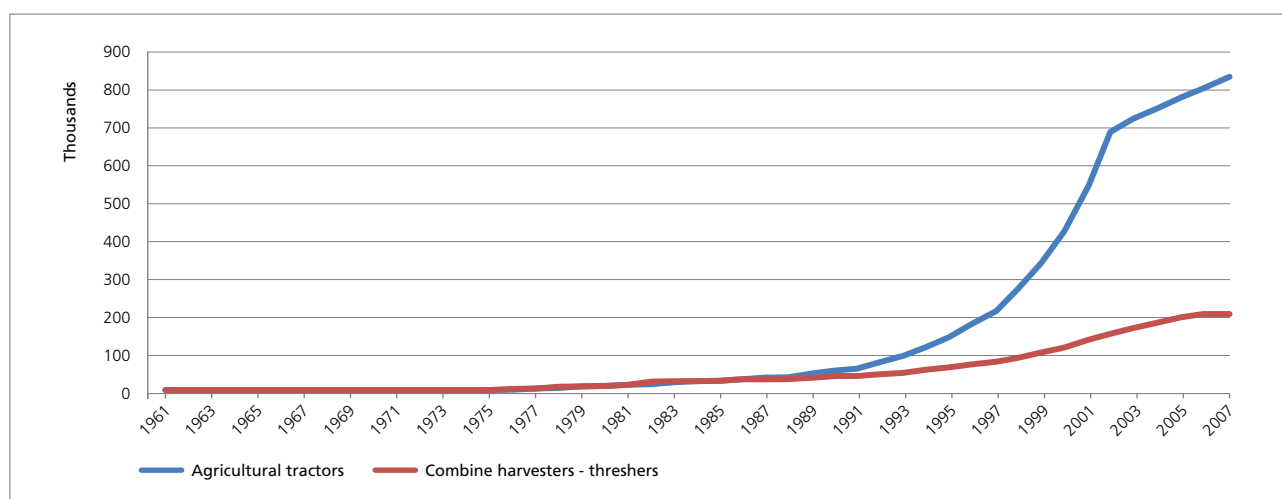
Source: FAOSTAT.

Figure 16: Growing use of fertilisers, 1962-2007

Source: FAOSTAT.

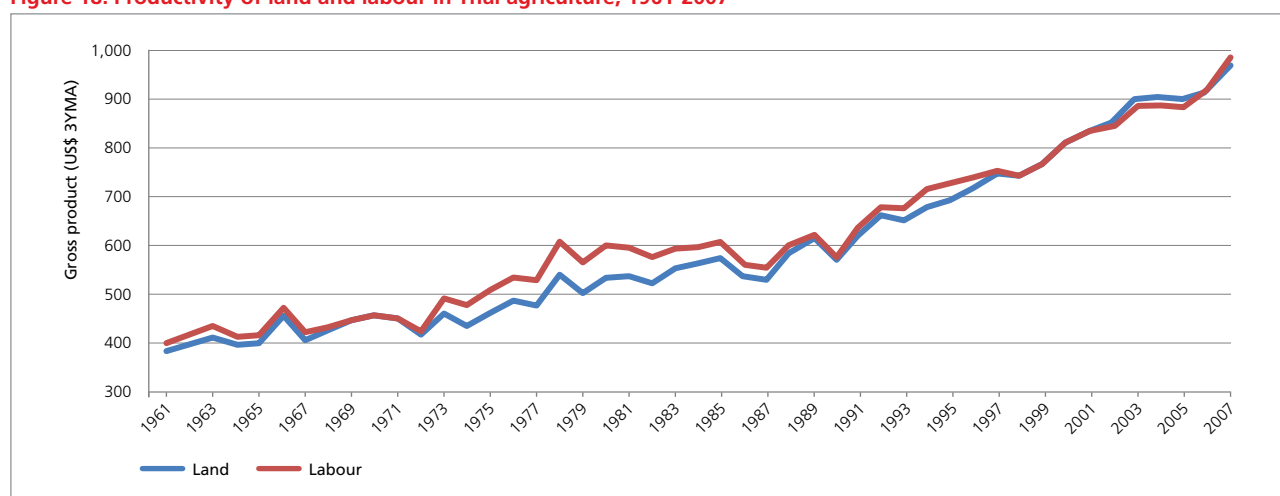
Labour has left farming, attracted by higher incomes in manufacturing and services. Thousands of workers left agriculture during the economic boom, substituted for by rapid mechanisation of Thai agriculture (Figure 17).

These considerable changes mean that productivity of land and labour has improved markedly since the early 1990s (Figure 18 and Table 5). Since this time, yields have been growing at almost 2.8% a year on average, and output per worker has grown by an average of 2.4% a year.

Figure 17: Mechanisation of Thai agriculture, 1961-2007

Source: FAOSTAT.

Figure 18: Productivity of land and labour in Thai agriculture, 1961-2007



Note: Labour before 1980 proxied, as explained in the note on Figure 14.

Source: Computed from FAOSTAT data.

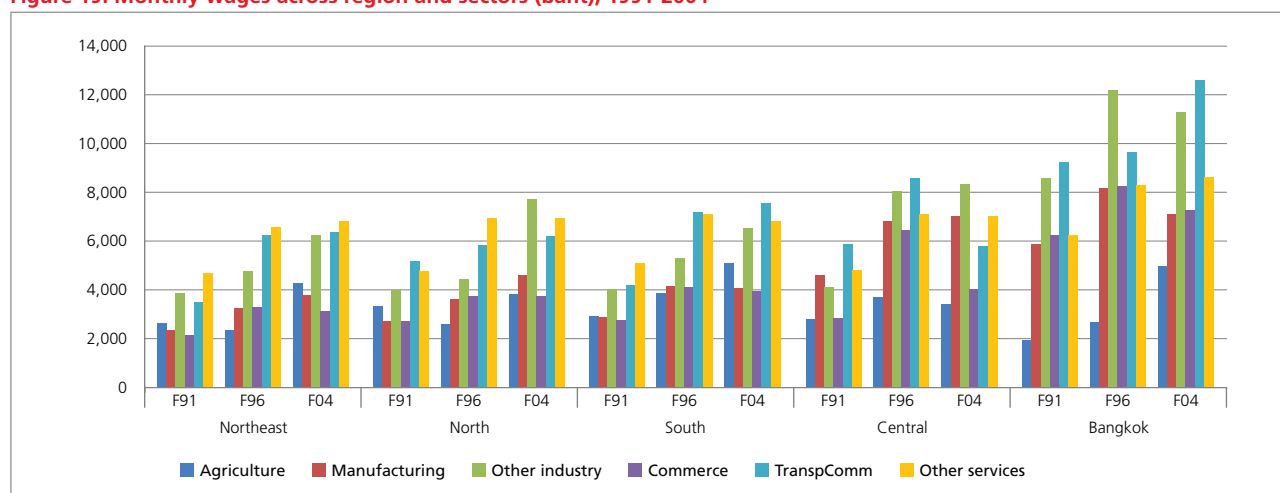
Table 5: Average growth rates of Thai land and labour productivity, 1960/61-2005/07

Average annual growth of production, \$, 99/01, against:	60/61 to 89/91	89/91 to 05/07
Agricultural area, ha	1.48	2.78
Economically active population in agriculture	1.63	2.42

Source: Computed from FAOSTAT data.

As farm labour productivity has risen, in the presence of competition for workers from other sectors, farm wages have increased. From 1991 to 2004, average agriculture wages rose above wages in the manufacturing and services sectors in the south and in the northeast (Figure 19). In the north, from 1996, agricultural wages grew quicker than those in the manufacturing and services sectors.

Figure 19: Monthly wages across region and sectors (baht), 1991-2004



Source: NESDB and World Bank (2005).

As land and labour have been withdrawn from farming, more capital has been used – facilitated by increasing availability of formal credit. Since 1980, it is estimated that almost all the contribution to agricultural growth has come from capital (60%) and from technical progress (43.5%) (Table 6).

Table 6: Factors contribution to agricultural GDP growth, 1981-2003

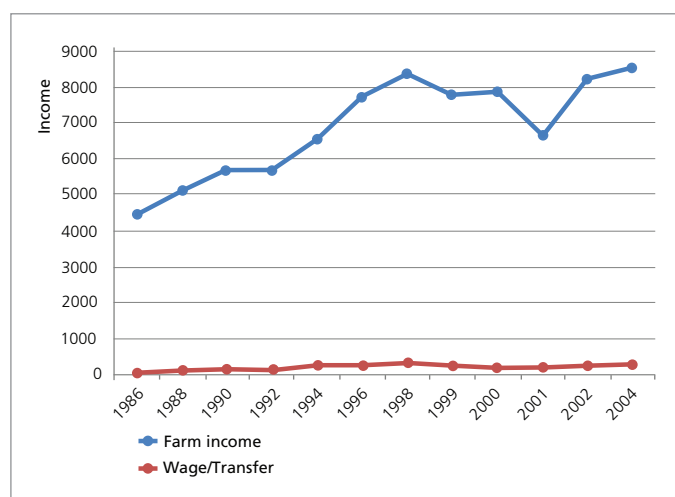
	Labour	Land	Capital	Technological progress
Absolute contribution to agricultural growth (annual growth points)	-0.28	0.16	2.06	1.50
Relative contribution (%)	-8.1	4.6	59.9	43.5

Source: Poapongsakorn (2006).

4.2 New markets behind the growth of specialised professional farmers

While rural incomes have diversified, a substantial and growing share of Thai farmers have also specialised. These farmers are technically innovative and focused on markets, especially higher-value markets that have emerged with economic growth. So-called 'professional farmers' represented 19.5% of Thai farmers in 2004, against 16.8% in 1986 (Poapongsakorn, 2006). Incomes of professional farmers quickly grew during the economic boom of 1980-1996, while the share of agriculture in the economy was in contraction (Figure 20).

Figure 20: Professional farmers' income trend (baht per month), 1986-2004



Source: NSO Socio-Economic Survey, in Poapongsakorn (2006).

Contract farming is a typical marketing arrangement for these farmers. Supermarkets have led the development of higher-quality food standards, offering a price premium for contracted producers. The government has facilitated the emergence of contract farming schemes (Benziger, 1996), by supporting interaction among smallholders and between them and private companies supplying inputs and purchasing products.

The domestic and export market for organic food products is now in rapid expansion. Price differentials between regular products and organic products, but also between regular and food safety-certified products, are quite significant (Table 7). Opportunities in these markets are important factors driving the emergence of a new class of more specialised farmers, who often receive higher returns from their work.

Table 7: Price differential between organic, safe and regular food products, 2005

Type	Average organic price (baht/kg)	Average safe price (baht/kg)	Average regular price (baht/kg)	Difference between organic and regular (%)	Difference between safe and regular (%)
Hot chilli	250.0	211.3	65.0	284.6	225.0
Cucumber	58.2	48.7	19.0	206.1	156.1
Kale	89.3	48.7	45.2	97.8	91.0
Cabbage	60.5	86.3	28.5	112.3	178.9
Scallion	-	79.5	139.8	-	50.3
Morning glory	52.0	210.0	33.4	55.6	55.6
String bean	85.0	52.0	54.1	57.2	90.0
White greens	59.0	102.8	41.7	41.6	85.4
Flowering cabbage	85.0	67.8	38.3	121.7	76.7

Note: Average prices obtained from one supermarket and four hypermarkets in Bangkok.

Source: TDRI survey, November 2005, in Poapongsakorn (2006).

Commercialised farming also looks for opportunities to trade on international markets. Thailand, a founder member of the Cairns Group of agricultural exporters, has been an active member of the G20 in pushing for more liberalised global trading rules in the ongoing Doha Round negotiation. Following disappointing progress of multilateral agreements, it has also negotiated, or is negotiating, a dozen bilateral free trade agreements (FTAs), with Japan, China, the US and Australia in particular.

Studies show that that Thailand would benefit from liberalisation of agricultural trade, at both multilateral (Poapongsakorn et al., 2005, in Poapongsakorn, 2006) and bilateral level. Farm households will enjoy higher income gains than non-farm households (through lower prices of food). The same studies predict that the poor (except the poorest) and the richest farm households will gain more from multilateral liberalisation than middle-income farm households.

4.3 A favourable environment for foreign and domestic investment and the growth of agribusiness

There is an ancient tradition of agribusiness in Thailand. Its modern form derives from trading arrangements between Chinese and European traders and the Ayutthaya kingdom, in relation to the rice trade in particular (Falvey, 2000).

The agribusiness sector is actually much more important in volume than agriculture itself. At the end of the 1990s, agriculture and agribusiness together represented about 50% of the Thai economy (Falvey, 2000). Although European and Chinese interests led its early development for the most part, the government of Thailand has strongly supported the emergence of a national agribusiness sector, developing several public or semi-public agribusiness companies, involved in upstream and downstream sides of agriculture. Agribusiness has been very instrumental in developing exports, for cassava, as has been well documented (Hershey et al., 2001), but also for most other exports.

Examples of agribusiness in driving agriculture include: international animal feed companies opening new export markets, such as for dried cassava; and supermarkets stimulating growth of higher-value produce in domestic markets, often getting supplies from contracted farmers, thereby encouraging them to specialise.

Besides their marketing power, agribusiness companies have been important players also in the development of input supply chains, in the diffusion of improved varieties and in new production relationships, such as contract farming and certification. Agribusinesses have often had a strong influence in setting up priorities for agricultural policies. In sugar, for example, the sugar industry supported cane producers' subsidies, as it needed sufficient cane production to run large-scale production units (Warr and Kohpaiboon, 2007).

4.4 Agriculture and rural development policies

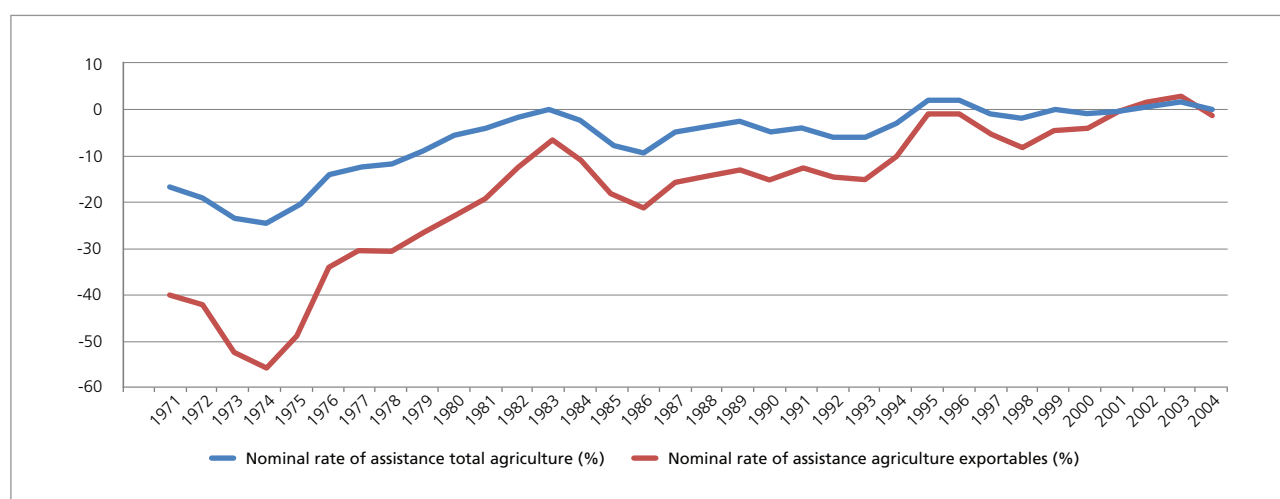
4.4.1 Evolution of agriculture taxation – a shift in public policies

Until the early 1980s, Thai agriculture was the country's engine of growth. Nevertheless, agricultural exports were heavily taxed to raise the necessary resources to invest in other sectors of the economy. Rice was subjected to a fixed tax on exports, ad valorem duty, volume limits to exports and a requirement that exporters sell a share of rice at rates below the market price for every ton of rice exported (Krongkaew, 1985). Exporters were further penalised by overvaluation of the baht.

Heavy taxation in agriculture also resulted from urban elites' political domination of the rural masses, who were largely uneducated. Their primary purpose was to raise revenue for the state and to keep the domestic price of rice low, thereby helping hold down labour costs. These policies contributed to successful industrial development of the country: by 1989, more than 30% of Thailand's GDP came from manufacturing, whereas agriculture contributed only 20%.

Successful industrialisation then allowed the country to ease taxation on farming. After record taxation in 1974 (55%, see Figure 21), taxation levels declined progressively until the early 1980s. Up until the economic crisis of the late 1990s, only products for which Thailand enjoyed a clear productivity advantage (e.g. rice) remained taxed, albeit at a lower level. For most other products, export taxes were removed, and the baht was devalued a few times in the early 1980s (Poapongsakorn, 2006). Intervention prices have even been set up for commodities such as rice, which Thailand produces at one of the lowest costs in the world (Warr and Kohpaiboon, 2007). After 1997, and with growing pressure from a better educated rural population, measures were taken to support farmers (ibid), such that net taxation of farming is now practically ended.

Figure 21: Nominal rate of assistance in Thai agriculture, 1971-2003



Source: Database of Distortions to Agricultural Incentives, CIES, University of Adelaide.

4.4.2 Infrastructure development: Roads, irrigation and telecoms

For the past several decades, infrastructure has improved gradually. The total length of roads increased from 38,244km in 1977 to 52,960km in 2000, equivalent to an annual growth rate of 1.4%. Rural roads experienced even faster growth, from 6,258km in 1977 to 67,138km in 2000, a 10-fold increase over two decades. Rural road density has increased from 12km to 124km per 1000km². Road network expansion has played an important role in the development of the northeast, where half of Thai farmers live (World Bank 2009). Foreign assistance, in particular from the US and the World Bank, has helped improve infrastructure in this region (ibid). Road financing has included both highways and feeder roads, but has also strengthened road equipment and maintenance.

Major irrigation works were carried out in the 1970s and the early 1980s, mostly concentrated in the central plain, with a significant amount of foreign assistance. Despite abundant and free irrigation water, irrigation systems suffered from inefficient water use (Poapongsakorn, 2006). Investments in irrigation contracted from the mid-1980s, and further development shifted towards smaller-scale systems and to irrigation in less favourable areas. Irrigation and roads developments were major contributors to the increase in agricultural productivity, and rightly received an important share of public investment. Yet, looking at the last 30-year period, education, agriculture research and telecommunications have proved more cost effective in terms of raising agriculture productivity (Fan et al., 2004).

Since 1977, the number of rural telecom lines has grown by more than 20% every year.⁴ With very little public investment, rural telecom expansion contributed greatly to agricultural productivity growth (Fan et al., 2004).

4.4.3 Agriculture research

Agriculture research has by far the largest productivity impact when compared with other public expenditure. For every additional baht invested in agriculture research, agricultural productivity is estimated to increase by 12.6 baht (Fan et al., 2004). Despite this, spending on research has stagnated, and even declined relative to agricultural GDP (Poapongsakorn, 2006). With the recent intensification of Thai agriculture, uptake of agriculture research outputs has increased, as seen with modern rice varieties, use of improved rubber trees and improved varieties of maize, soybean and cassava (Poapongsakorn, 2006; World Bank, 2009).

4.4.4 Rural education

Thailand has promoted universal primary education since the 1960s. Average rural literacy rates reached 80% before the end of the 1970s. Education investments and levels were even higher in the northwest and, overall, rural education level is among the highest in developing countries (Fan et al., 2004). This analysis suggests that investments in education have had an important impact on agricultural labour productivity growth, which, perhaps unexpectedly, was more important than that on non-agricultural employment and poverty reduction.

4.4.5 Provision of agricultural credit through institutional innovations

Stimulating the development of rural private enterprise proves challenging in most developing countries. Government policies need to find the right balance between stepping in to correct market failures and to provide key public goods that will stimulate initial private investments, and moving out of the way to create the conditions for a sustainable enabling environment for business enterprise. Getting the right balance, as well as the right sequence, is not straightforward. The history of rural credit policy in Thailand is a good example of such a success.

Lack of access to credit is a severe limitation to agricultural investment and progress in terms of productivity for many small farmers across the developing world (World Bank, 2007). Rural credit markets fail because formal banks have little information on the character and competence of farmers; risks are high in farming, with consequent high risks of involuntary default; administrative costs can be high when lending to small farmers located across large areas of countryside, some with difficult access; and few small farmers have either land titles or other assets to offer as collateral for loans. Despite innovations such as microfinance, providing widespread credit to smallholders remains a challenge in most developing countries (World Bank, 2007).

⁴. Period average based on data presented in Fan et al. (2004: Table 10).

Thailand achieved early and significant progress, however, facilitated by Bank of Thailand policy (Fitchett, 1999). The bank mandated allocation targets for agricultural and agribusiness lending to commercial banks;⁵ imposed interest rates for agriculture that were not higher than non-agriculture lending; and offered rediscount facilities for agricultural loans.

But commercial banks still offered credit mostly to large farmers. Access to credit for small and medium farmers came primarily through the state-owned Bank for Agriculture and Agricultural Cooperatives (BAAC). Established in 1966, in 1971 it introduced a group liability guarantee which enabled small farmers to access short-term credit without land titles as collateral (Fitchett, 1999; Klein et al., 2000). Until the late 1990s, BAAC operations were largely guaranteed by the Bank of Thailand and supported by the international financial institutions.

The BAAC rapidly expanded its rural network, to more than 657 branches and 850 rural offices by the end of the 1990s (Klein et al., 1999), and to 962 rural offices by 2008 (BAAC, 2009). Management of small loans was decentralised to cut administrative costs. Once the BAAC was well established, it worked to attract saving in the 1980s. Deposits rose quickly, thanks to its wide network and competitive interest rates, and to positive perceptions of the BAAC by its client base. Growing deposits and improving loan recovery helped the BAAC gradually become less dependent on subsidies (Fitchett, 1999; Meyer and Nagarajan, 2000). Self-financing enabled the BAAC to expand credit quickly and sustainably, reaching 90% of farm households and all farm cooperatives. Between 1985 and 2003, its registered clientele rose from 1.38 to 3.73 million households, at an average annual growth rate of about 5.7%, with loans to individual farmers increasing more than 17 times, from 14.9 to 258.1 billion baht (Poapongsakorn, 2006). By 2008, BAAC credit had reached 6.07 million farm families, 4.54 million directly and the rest through cooperatives and associations, with the loan portfolio up to 480 billion baht (\$13 billion) (BAAC, 2009). Group lending proved successful: in 1998, it represented 92% of BAAC activity.

Not all was perfect: reviews at end of the 1990s noted there was still room for progress in loan recovery to agriculture cooperatives and farmers' associations (Fitchett, 1999) – in 2008, overdue loans were running at 8%. Moreover, the BAAC was still unable to reach the most marginalised farmers (Klein et al., 1999).

Nevertheless, a sustainable institution has been created, one which, by ensuring most small farmers can obtain credit and other financial services, has contributed to the development of more capital- and technology-intensive agriculture since the 1980s.

4.5 Transition to a diversified rural economy

The rural non-farm economy has grown to the point where it provides around half of all rural jobs. Many of these are linked to prospering agriculture: in central Thailand, Poapongsakorn (1994, in Haggblade et al., 2007: 138) observed vibrant agro-processing, both upstream and downstream of farms:

'Growing paddy, sugar, and cassava surpluses led to the emergence of thousands of rice mills as well as sugar refineries, cassava brokers, producers of tapioca pellets, construction operations, metal workshops, and agricultural equipment manufacturers, as well as livestock feed and village retail shops.'

In the less agriculturally prosperous northeast, different patterns emerged, with non-farm activities often contributing to farmers' income diversification:

'Meanwhile, in the sluggish Northeast households also diversified, not because of expanding opportunities but rather because of the inability of agriculture to keep pace with the growing population. In this resource-poor region, rural nonfarm diversification centred around labour-intensive export activities such as gemstone cutting, silk weaving, and production of artificial flowers, all for export.'

⁵ From 1975, all commercial banks had to allocate 5% of all commercial loans for agriculture at an interest rate lower than the market rate. This was later increased to 11% (1978), when an additional 2% of lending to agribusiness/agro-industries was also mandated. These mandated shares continued to rise until 1987, when they were increased to 14% for agriculture and 6% for agribusiness. Shortfalls in these targets were to be deposited in interest-bearing accounts with the Bank for Agriculture and Agricultural Cooperatives (BAAC).

5. Conclusions

Over the past 50 years or so, Thailand has been largely successful in managing the transition from an agrarian economy dependent on primary exports, providing low-income livelihoods for the majority of the population, to an economy based largely on manufacturing and services, with most activity urban and much increased incomes. Agriculture has played a significant role in this: supporting the rise in manufacturing by providing staple foods at low cost, earning foreign exchange through its exports and providing through taxes the bulk of public revenues.

During the first two decades of industrialisation, agriculture grew largely by putting to use underused factors of production, forest land and the labour of a growing population. Returns to farming were sufficient to allow the state to extract a surplus from farming through export taxes and by overvaluing the exchange rate. By the 1980s, manufacturing had overtaken agriculture in size, and so taxation eased. With more pressing land and labour constraints, agricultural growth has become increasingly a result of intensification of production and application of more fertiliser, to raise yields per hectare and output per worker, facilitated by provision of rural credit. Mechanisation has also contributed to higher returns to labour.

Many farm households have diversified their income sources, with greater participation in non-farm activities. Farming has increasingly become an activity for ageing parents; the young and well educated have other jobs, while the wife may well have a non-farm occupation as well. At the same time, there has been some specialisation of agriculture, as farmers have taken up opportunities in domestic and international markets for higher-value produce. Thailand, which once exported largely rice and teak, has become a world leader in exports of crops such as cassava, pineapple, rubber and shrimp.

Meanwhile, rural poverty has fallen rapidly, in the 1960s and 1970s on the basis of rising farm incomes, but subsequently thanks to migration to the cities and to a vibrant rural non-farm economy – including some rural industrialisation.

5.1 Key lessons

- The Thai story is a good example of **managing a transition** from an initial situation, in which it was possible for agriculture to grow by putting underused factors of production to work, with only limited improvements in productivity, to a later stage, in which land and labour became increasingly scarce and growth could continue only through improved returns to these factors.
- Much of what has taken place has been down to **private initiative**, both from farmers and from the agribusiness concerns in the supply chain.
- However, **the state has facilitated and encouraged this** by focusing on key strategic interventions, including:
 - The **opening of new land encouraged by tenure rules**, which allowed family farmers to clear enough land, 4-8 hectares, for a small farm and then gain secure property rights, so long as they paid taxes. The government also turned a blind eye in the 1960s and 1970s to squatting in what were meant to be protected forests – laws were applied only later.
 - The **building of roads** that provided access to new lands and the **construction of irrigation works**, especially important before 1980 or so. Thereafter, these investments were complemented by more spending on rural education, electrification and telecommunications. Large-scale irrigation investments were replaced by policies supporting private investment on small-scale schemes. Investments in public infrastructure have often been **supported by foreign assistance**.
 - Investments in **agriculture research** and **rural education**, which have contributed to agricultural labour productivity growth. Education has helped young rural adults to seize opportunities for employment outside of the agriculture sector.

- **Channelling of funds through a state-owned bank**, in order to resolve shortages of credit to small farms. Once financing could be secured through deposit schemes (thanks to a positive image and a wide network of branches), the government progressively stepped out, aiming at sustainability of rural credit services.
- **Promotion of agricultural exports through active participation in trade talks**, through multilateral, regional and bilateral negotiations.
- Less clearly positive has been **taxation of agriculture**, which was heavy in the 1960s and 1970s, as resources were transferred deliberately from farming to other sectors. Production grew despite the considerable disincentive, presumably because new lands, cheap labour and lack of alternative employment at the time meant farming could bear the costs and still provide livelihoods. By the 1980s, the state had the wisdom to reduce taxes to allow the baht to devalue when it was no longer so important, thus lifting much of the burden off farmers. Subsequently, protection against shocks was introduced, such as intervention prices for rice.

5.2 Challenges

The challenges in agricultural and rural development in contemporary Thailand are those of a middle-income economy, namely:

- There is a need to continue to provide **conditions that allow rural people to diversify their livelihoods or leave agriculture** altogether, while permitting specialised farmers to invest and innovate.
- While public goods matter, **some policy challenges are institutional**, above all in linking small farmers to increasingly demanding supply chains and ensuring that land tenure protects rights while allowing full-time farmers to use agricultural land.
- It remains key to **correct for environmental harm** caused by intensifying farming systems.

References

- BAAC (2009) 'Annual Report Fiscal Year 2008 (1 April 2008-31 March 2009).' Bangkok: BAAC.
- Barker, R. and Molle, F. (2004) 'Evolution of Irrigation in South and Southeast Asia.' Research Report 5. Colombo: Comprehensive Assessment Secretariat.
- Benziger, V. (1996) 'Small Fields, Big Money: Two Successful Programs Helping Small Farmers Make the Transition to High Value-Added Crops.' *World Development* 24(11): 1681-1693.
- Cherdchuchai, S. and Otsuka, K. (2006) 'Rural Income Dynamics and Poverty Reduction in Thai Villages from 1987 to 2004.' *Agricultural Economics* 35(S3): 409-423.
- Deolalikar, A.B. (2002) 'Poverty, Growth and Inequality in Thailand.' ERD Working Paper 8. Manila: ADB.
- Ekasingh, B., Sungkapitux, C., Kitchaicharoen, J. and Suebpongsang, P. (2007) 'Competitive Commercial Agriculture in the Northeast of Thailand.' Chiang Mai: Department of Agricultural Economics and the Multiple Cropping Center Faculty of Agriculture, Chiang Mai University.
- Falvey, L. (2000) 'Thai Agriculture: Golden Cradle of Millennia.' Bangkok: Kasetsart University.
- Fan, S., Jitsuchon, S. and Methakunnavut, N. (2004) 'The Importance of Public Investment for Reducing Rural Poverty in Middle-Income Countries: The Case of Thailand.' DSGD Discussion Paper 7. Washington, DC: IFPRI.
- Fitchett, D. (1999) 'Bank for Agriculture and Agricultural Cooperatives (BAAC), Thailand.' Case Study for the Consultative Group to Assist the Poorest Working Group on Savings Mobilization.
- Haggblade, S., Hazell, R.B.R. and Reardon, T. (2007) *Transforming the Rural Nonfarm Economy: Opportunities and Threats in the Developing World*. Baltimore, MD Johns Hopkins University Press.
- Hershey, C., Henry, G., Best, R., Kawano, K., Howeler, R.H. and Iglesias, C. (2001) 'Cassava in Asia: Expanding the Competitive Edge in Diversified Markets,' in *A Review of Cassava in Asia with Country Case Studies on Thailand and Vietnam*. Proceedings of the Validation Forum on the Global Cassava Development Strategy. Rome, 26-28 April 2000.
- Isvilanonda S. and Bunyasiri, I. (2009) 'Food Security in Thailand, Status, Rural Poor Vulnerability, and Some Policy Options.' ARE Working Paper 2552/1. Bangkok: Kasetsart University.
- Klein, B., Meyer, R.L., Hannig, A., Burnett, J. and Fiebig, M. (1999) 'Better Practices in Agricultural Lending.' Agricultural Finance Revisited 3. Rome: FAO and GTZ.
- Krongkaew, M. (1985) 'Agricultural Development, Rural Poverty, and Income Distribution in Thailand.' *The Developing Economies* 23(4): 325-346.
- Krongkaew, M. (1993) 'Poverty and Income Distribution,' in Warr, P.G. (ed.) (1993) *The Thai Economy in Transition*. Cambridge: Cambridge University Press.
- Krongkaew, M., Tinakorn, P. and Suphachalasai, S. (1992) 'Rural Poverty in Thailand: Policy Issues and Responses,' *Asian Development Review* 10(1): 199-225.
- Krongkaew, M., Chamnivickorn, S. and Nitithanprapas, I. (2006) 'Economic Growth, Employment, and Poverty Reduction Linkages: The Case of Thailand.' Issues in Employment and Poverty Discussion Paper 20. Geneva: ILO.
- Meyer R.L. and Nagarajan, G. (2000) 'Rural Financial Markets in Asia: Flagships and Failures.' Mini-Symposium on Building Financial Markets in Developing Countries for Tomorrow's Agriculture: Status, Reforms, and Innovations, XXIV International Conference of Agricultural Economists. Berlin, 13-18 August.
- Moncharoen P., Vearasilp, T. and Eswaran, H. (2001) 'Land Resource Constraints for Sustainable Agriculture in Thailand.' In Stott, D.E., Mohtar, R.H. and Steinhardt, G.C. (eds.) (2001) *Sustaining the Global Farm*. Selected Papers from the 10th International Soil Conservation Organization Meeting held at Purdue University, West Lafayette, IN, 24-29 May 1999.

- NESDB and UN (2004) 'Thailand Millennium Development Goals Report 2004.' Bangkok: NESDB and World Bank.
- NESDB and World Bank (2005) 'North East Development Report, 2005.' Bangkok: NESDB and World Bank.
- Otsuka, K. and Yamano, T. (2006) 'The Role of Rural Labor Markets in Poverty Reduction: Evidence from Asia and East Africa.' Background Paper for World Bank (2007).
- Paitoonpong, S. (1999) 'Consultations with the Poor: National Synthesis Report, Thailand.' Commissioned by the World Bank.
- Poapongsakorn, N. (2006) 'The Decline and Recovery of Thai Agriculture: Causes, Responses, Prospects and Challenges,' in FAO (2006) *Rapid Growth of Selected Asian Countries, Lessons and Implications for Agriculture and Food Security*. Bangkok: Regional FAO Office for Asia and the Pacific.
- Ratanawaraha, C., Senanarong, N. and Suriyapan, P. (2001) 'Status of Cassava in Thailand: Implications for Future Research and Development.' Rome: FAO.
- Sriroth, K., Lamchaiyaphum, B. and Piyachomkwan, K. (2000) 'Present Situation and Future Potential of Cassava in Thailand.' 6th Regional Cassava Workshop. Ho Chi Minh City, 21-25 February.
- Suphannachart, W. and Warr, P. (2009) 'Research and Productivity in Thai Agriculture.' 6th Australasian Development Economics Workshop. Sydney, 11 June 2010.
- Warr, P. (2000) 'Is Growth Good for the Poor? Thailand's Boom and Bust.' *International Journal of Social Economics* 27(7-10): 862-877.
- Warr, P. (2004) 'Globalization, Growth, and Poverty Reduction in Thailand.' *ASEAN Economic Bulletin* 21(1): 1-18.
- Warr, P. and Kohpaiboon, A. (2007) 'Distortions to Agricultural Incentives in Thailand.' Agricultural Distortions Working Paper 25. Washington, DC: World Bank.
- Watanabe, M., Jinji, N. and Kurihara, M. (2009) 'Is the Development of the Agro-Processing Industry Pro-Poor? The Case of Thailand.' *Journal of Asian Economics* 20(4): 443-455.
- World Bank (1999a) *Coping with the Crisis in Education and Health*. Washington, DC: World Bank.
- World Bank (1999b) *Challenge for Social Reform*. Washington, DC: World Bank.
- World Bank (2000a) *Thai Workers and the Crisis*. Washington, DC: World Bank.
- World Bank (2000b) *Social Capital and the Crisis*. Washington, DC: World Bank.
- World Bank (2007) *World Development Report 2008: Agriculture for Development*. Washington, DC: World Bank.
- World Bank (2009) 'Past Experience: Asia and Latin America vs. Sub-Saharan Africa,' in World Bank (2009) *Awakening Africa's Sleeping Giant Prospects for Commercial Agriculture in the Guinea Savannah Zone and Beyond*. Washington, DC: World Bank.
- Zepeda, E. (2004) 'Pro-Poor Growth: What Is It?' Brasilia: IPC.