

Chapter 6

Agriculture and Politics: From the 1930s

Agriculture and rural development had long ceased to be central to policy before the new modern views and constitutional monarchy of the 1932 revolution arrived. This may seem unlikely, considering reliance on agricultural exports and expansion of small-holders throughout the Kingdom. However, reliance on a dualistic policy of foreigners marketing rice and producing, processing, and marketing other cash crops, while using taxation as the principle means of funding State development and repaying debt, required no long-term vision for agriculture; experience had taught that surpluses could be reliably expected from minimal State investment. The policy made the Kingdom easy to manage economically while stability and expansion of Bangkok influence was a primary focus, provided markets remained strong and foreign investors favoured the country.

Agricultural Policies from 1932

Post-World War I price reductions for agricultural commodities had exacerbated the effect of inappropriate exchange rate policies until an adjustment in 1923 allowed an improvement in exports. The essential lesson for an agricultural commodity exporting country that prices should reflect global trends had been offered to Thailand, although it would need to be offered several times subsequently. Later for example, World War II introduced further policy challenges when imports were restricted and production incentives introduced. Incentives included a 39 times increase in the price of sugar over the 1937-1940 average, and a 29 times increase in grey cotton yarn; such policies increased inflation much more than production.¹

¹ Ingram, J.C. (1971)

The role of the small-holder farmer was little appreciated, notwithstanding the crusade of Prince Sithiporn Kridakara and his journal *Kasikorn* from 1927, and his emphasis of the need for policies which encouraged agricultural research and a wider understanding of the unique role of agriculture in Thai society. Part of an increasingly vocal intelligencia, such voices were subsumed in the constitutional change precipitated by the confluence of wider interests, and the 1930s depression.

The 1932 reaction to financial crisis was a reduction in civil service positions and a token, against the 60 percent reduction in their cash incomes, 20 percent reduction in land tax for small-holders; mercantile and noble classes remained lightly taxed. Small-holders left exposed to the depression reverted to self-sufficient farming. Still liable to pay tax, some rice destined for home consumption was sold at the prevailing low prices. No peasant rebellion resulted, probably because provincial leaders had been tied to the central administrative system, and no alternative leadership structure had arisen. Nevertheless, thousands of small-holders petitioned the King for aid.²

Politics remained the preserve of a small ruling elite and development policies were funded by taxing a subsistence rice economy which was shifting to market production. Peasant politics thus remained unformed until the 1960s, when tenancy issues in the poor Northeast encouraged expansion of the long established yet small Communist Party.³ Thus, only in the 1960s did the economic plans espoused in the rhetoric of new 1930s⁴ constitution begin to be implemented. For example, attempts at land resource laws through the 1930s, 1940s, and 1950s that included survey, registration, titles issuance, allocation systems, and State lands management all suffered under benign civil service inactivity until the introduction of the First National Economic Development Plan in 1961. That Plan included a land allocation policy which acknowledged for the first time, the issue of landless farmers.⁵

Notwithstanding this slow rate of change, the 1932 revolution highlighted unfair trading arrangements embodied in import substitution and other policies. In

² Wyatt, D.K. (1984)

³ Cheong, Yong Mun. (1992)

⁴ Vella, W.E. (1955)

⁵ Arbhahirama, Anat. et al (1987)

particular, the period fostered a platform for concern documented in the Pridi (Bhanomyong) Plan, which used the plight of the rural poor to propose a socialist solution to the problems of landlessness, poor prices, middlemen, and poor State welfare.⁶ With Government ownership of lands, he proposed that peasants become State employees receiving fair wages derived from open trading of product. Quashed by the aristocracy, the draft legislation of the Pridi Plan was exiled with Pridi. Revisions of foreign trade agreements, replacement of foreign with domestic entrepreneurs, and ensuring a sacrosanct role for the expanding bureaucracy, each produced forces against the Pridi Plan.⁷ A revised plan omitting contentious land ownership aspects, while retaining the essence of government infrastructure and support services, reflected the intent if not action of the decade.

The thirty years from the 1930s may be seen as slow preparation for adoption of more foreign ideas; in fact foreign education of a generation of new leaders through the period ensured this direction. Links across the period are evident for example, in the first systematic study of Thai soils, the Pendleton Provisional Map of 1935, being updated from the mid 1960's⁸ when Thai expertise assumed much of the task.

Policies Post-World War II

The clearest indication of agricultural policy objectives of the period are reflected in the roles allocated to agricultural agencies prior to the 1953 establishment of a modern Ministry of Agriculture. These roles were:

- to improve Thailand's competitive position relative to other rice production countries through increased production and system efficiencies
- to introduce multiple cropping with rice and other new crops
- to promote livestock production.

These objectives have remained relatively consistent over a period of 50 years,⁹ with limited effect. By 1992, rice mono-cropping was still the norm for nearly half of farmers, crop diversification within individual farms was unusual,¹⁰

⁶ Landon, K.P. (1939)

⁷ Phongpaichit, Pasuk. and Baker, C. (1997)

⁸ FAO (1972a)

⁹ Poapongsakorn, Nipon. et al (1995)

¹⁰ Siamwalla, Ammar. et al (1992)

and livestock, other than those controlled by multinational contract farming systems, languished as draft animals were assumed by many to be an inevitable casualty of agricultural modernisation.

The lot of the small-holder farmer was to change again as powerful commercial forces transformed rice marketing arrangements and government shifted its own role. Government no longer sought to regulate merchant exploitation of small-holders, instead it consorted with merchants to enhance expansion of the rice production economy. Small-holders were to become commercial farmers or wage labourers. Rice plantings rose by some 68 percent from the 1950s to the 1980s as a result of this approach, with expansion including the now populous, yet agriculturally less productive, Northeast.¹¹ This period introduced a new philosophy of development which assumed that the adoption of Western models would lead to economic development.¹² Under this rubric, Thailand progressively demoted agriculture in favour of industrial development, on a basis which was essentially similar to nations with less, or even limited, agricultural potential.

Policies of the period since World War II built on controlled inflation and enhanced agricultural exports. However, the absence of a mechanism to share foreign exchange income with producers was effectively a tax as was regulation of domestic rice prices to offset some post-war adjustment among the urban classes. Promotion of rice expansion inadvertently led to forest destruction as new lands were opened faster than ever before through the 1960s and 1970s. In the Central Plain, rice began to benefit from pieces of the van der Heide master irrigation scheme implemented through the 1950s with the arrival of Green Revolution varieties and practices.¹³ Roads, built by government, facilitated sale of produce which stimulated further expansion of cropping, particularly maize, kenaf, and cassava. Subsidised by government, commercial sugar investors expanded. Rubber planting expanded in the South. Through this important period of expansion, agriculture was critical in two ways:

- agricultural growth created the overall growth of Thai economy
- agriculture absorbed most of the rapid rise in population as a *de facto* welfare program.

¹¹ Phongpaichit, Pasuk. and Baker, C. (1997)

¹² Yuthavong, Yongyuth. and Wojcik, M. (1997)

¹³ Siamwalla, Ammar. (1996)

Through the 1970s, higher food prices than earlier decades spurred further expansion of agricultural lands, leading to Northeast cassava production doubling each four years and rice plantings outstripping irrigation capacity. However, other agricultural exporting countries also increased production and thus price competition. Remaining forested lands in Thailand were less suited to agriculture than those already opened. When global prices fell in the 1980s, the effect was passed to producers with minor reductions in taxes. Thus occurred the first increase in the incidence of rural poverty since statistics were collected. An unexpected boom from 1986 occurred when oil prices fell and a favourable change in exchange rates produced growth rates above ten percent year on year. Promotion of manufactured goods led many to assume that the engine of the economy had shifted from agriculture.

Industrial growth was almost exclusively urban and peri-urban, even when agricultural prices were low and rural hardship widespread. Agricultural productivity was stagnant, probably because larger infrastructure investments, particularly in irrigation were not pursued, and smaller replacement schemes were of variable benefit. Conspicuous wealth in the city and increasing hardship in rural areas caused migration of labour to the city. Throughout the four decades including the 1980s, new technology was introduced in the time honoured way of adopting, and sometimes adapting foreign innovations, with the Thai education system playing a facilitating role. Agricultural research and education continued to fail to reflect the role of agriculture in the overall economy,¹⁴ which effectively continued to be the funder of growth and social support.

Agro-Social Change

The abundance of new land for agricultural expansion was a hallmark of Thai agriculture in contrast to many countries. It explained the historic export capabilities of the Kingdom extending into the present day, despite a large increase in the population. The social atmosphere prior to the expansionary period of the 1950s was cohesive, compared to later land tenure and indebtedness issues. Population increase may have even provided a period when labour for agriculture was oversupplied, an historically rare occurrence, and soon overshadowed by the

¹⁴ Siamwalla, Ammar. (1996)

demands of forest clearing to open new lands.¹⁵ The attitudes of the small-holder agriculturists once shaped by an ability to feed their families, opportunities to improve their lot, and minimal external interference, were to change. While family food availability was threatened in only a minority of cases, from the 1960s opportunities for economic and social improvement were often negated by both indebtedness and external interference.

The costs of technological change over next three to four decades to 2000 affected the culture of the small-holder agriculturist. Owning one's farm became expensive. Participation in the international agricultural economy introduced social costs; for example, improved rice seeds are now offered as two or three varieties where farmers used to maintain a suite of thirty or more varieties to cover differing seasons,¹⁶ microenvironments, and tastes. The rationale that higher yielding varieties were introduced with a package of improved irrigation and fertiliser regimes which limit seasonal and micro-environment variations, introduced other risks, both environmental and social in terms of foreign ownership of seeds, for example. These aspects are discussed further in later chapters.

Higher inputs modified the environment in a manner yet to be understood. Certainly, lifestyle elements, including diverse foods such as crabs and fish in paddy fields, have changed from these agronomic advances. Changes have also been introduced in terms of reduced livestock numbers and changed functions for working animals. Ownership of large ruminants is now likely to be concentrated in a few persons compared to each family seeking to own at least one draught animal; tractor tillage introduced further demands on the cash needs of farming. Economic progress measured by crop outputs have neglected the roles of large livestock as banks, companions, status accoutrements, and accepted cultural currency for traditions which date back centuries, and the poorly understood yet emotive benefits attributed to biodiversity. Against such drawbacks, Thailand consolidated its presence as one of the world's major agricultural exporters.

With the State's hope of introducing widespread commercial farming came a final successful assault on land ownership. Financed by the World Bank

¹⁵ Donner, W. (1978)

¹⁶ Moerman, M. and Miller, P. (1989)

and founded on the assumption that small-holders would act more commercially if they had a tradeable land title, certificates of ownership and occupancy were issued covering 20 million rai (3.2 million hectare) in the Central Plain by the late 1970s. Improved irrigation facilities, fertiliser regimes, and rice varieties now allowed the growing of two or three crops per year across much of the Central Plain. By 1990, 22 percent of the Central Plain was double cropped, and across the whole Kingdom some eight percent, compared to virtually none in 1960.¹⁷ Encouraged to participate in the credit-based Green Revolution, small-holders were placed in the invidious position of risking their very security of production, the family plot. Indebtedness caused the sale of 20 percent of Central Plains farms by 1969, mainly those under 15 rai (2.4 hectare) in area, thereby creating a new tenant class of agriculturist.¹⁸

Tenancy arrangements were tempered by share cropping agreements, although the rising proportion of tenants increased the bargaining power of landlords. From tenant to landless was a simple step as wage labouring in agriculture grew from the 1950s leading to probably around 20 percent of families in rural areas relying totally on wage labour.¹⁹ Of perhaps similar importance to rural culture was the growth in off-farm employment to supplement inadequate incomes from agriculture; Thai farmers had joined the new world agriculture where the majority of farmers earn a substantial proportion of their income off-farm, although without the lifestyle connotations common to developed countries. The huge social change introduced an ongoing association between rural dwellers and poverty, which was expressed in terms of disparities in income, information access, education, health care, and associated accoutrements of the culture which the modernisation ethic promised.

The proportion of persons living below the poverty line was estimated at 61 percent in rural areas, and 38 percent in urban areas in 1963; 60 percent of poor villages were in the Northeast. At this time, new commercial approaches to agriculture were lauded for their output efficiency. Wage labouring was highly seasonal and minimum pay rates were officially below those of urban areas. The migration of rural workers, particularly from the Northeast, to urban work sites reflect cultural change including the demise of off-season activities of the past,

¹⁷ Phongpaichit, Pasuk. and Baker, C. (1997)

¹⁸ Ministry of Agriculture (1998)

¹⁹ Phongpaichit, Pasuk. and Baker, C. (1997)

such as crafts and the manufacture of utilitarian items, which were replaced by cheap factory-made alternatives.²⁰

The culture of the rural Thailand approximated the romantic national image. While values of co-existence with all life, self-sufficiency, and hospitality are easily ascribed to most non-urban groups, Thai origins were probably more broadly represented in the rural than the urban areas. The absorption of such ethnic groups as the Phu Thai, Lao Phuan, and Lao Song, whose lifestyle was far closer to that of the Tai and Thai of past eras, as new areas of the Central Plain were opened provided recent reminders. However, the gap between the rural and city cultures was already wider than realised when the government sought to integrate rural and urban areas in the 1960s.²¹ It was not until economic adjustments of the 1990s that interest in traditional rural values and the inequities of unchallenged imported philosophies were to gain currency.

As the uplands were developed for cash crops in response to three decades of high commodities prices and the access provided by roads built with assistance from the USA, agricultural research was broadened to include new crops, with some spectacular successes such as a new maize variety, Suwan.²² The expansion of upland agriculture was faster and on a grander scale than the previous expansion of wet rice across the whole delta; from 1950 to 1990, the area of upland crops rose from 43 to 130 million rai (seven to 16 million hectare). Initially rice was the cash crop, then kenaf expanded for production of rice sacks when the jute crops in Bangladesh failed. Maize area expanded from 0.25 to nine million rai (0.04 to 1.4 million hectare) between 1950 and 1980 while sugar, assisted by government banning of imports, increased to some five million rai (0.8 million hectare) by 1990. Cassava dominated upland cropping systems when kenaf demand waned, and enjoyed strong demand for European stock feed; from 0.8 million rai (0.1 million hectare) in the mid 1960s, cassava expanded to cover eight million rai (1.3 million hectare) by the late 1970s. Pineapples in peninsula Thailand expanded into an export industry from the late 1960s, eventually making Thailand the largest exporter of canned pineapple. With these and other products, including soya beans, cotton, oilseeds, mung beans, sorghum, tobacco, rubber, fish and prawn farms,

²⁰ Phongpaichit, Pasuk. and Baker, C. (1997)

²¹ Hewison, K. J. (1993)

²² Tribe, D. (1994)

and commercial forests,²³ Thai agriculture appeared to be diversified at last by the 1980s. However, frontier areas remained in the North.

Highland Agriculture

Expanding Thai agriculturists in the North eventually met hill tribe ethnic groups yet to assimilate into the Thai culture. Some integration resulted but most cultures and agricultural practices remained separated by altitude.²⁴ At lower altitudes, spring-fed wet rice agriculture of the Karen and Lua ethnic groups²⁵ adopted techniques from Thai neighbours. However, Thai knowledge of the highlands remained patchy in terms of the integrity of forests in shifting agricultural systems.²⁶ In itself this confirms the wet rice orientation of the Thai; land expansion reduced in the 1980s, not because no further land was available as is commonly claimed, but because the more labour intensive agriculture of highland areas was unappealing. Certainly elsewhere in Asia, inferior land had long been farmed. A greater onslaught into the highlands might have resulted if the population had continued to rise at the rate of earlier decades; however, Thailand proved to be a model case for effective population control.

Highland agriculture changed markedly from the 1980s through roads and government services. Consumer items were introduced and subsistence gave way to the growing of wet rice in tiny valley floors to provide a small surplus until alternative crops were proven.²⁷ Policies which aimed at reducing silting in lowland dams, securing border regions and demonstrating global citizenship perpetuated uninformed views of shifting agriculture which have recently revised to:

- while being widespread across the tropics, it varies and is in fact a group of several distinct approaches to agriculture²⁸
- being a system in itself rather than a development stage between primitive agriculture and a surplus oriented system
- being environmentally sensitive and sustainable when practised as a complete system, unimpeded by external or population pressure

²³ Phongpaichit, Pasuk. and Baker, C. (1997)

²⁴ Hirsch, P. (1990)

²⁵ Kunstadter, P. et al (1978)

²⁶ Thompson, V. (1967)

²⁷ Kunstadter, P. and Kunstadter, S. (1980)

²⁸ Spencer, J.E. (1966)

- being technologically as sophisticated as other systems of tropical agriculture
- being practiced by groups historically indistinguishable from their mono-cropping compatriots except in recent times when access to trade through foreign contact has spread a western view of development.²⁹

In fact, two years of planting in a ten year cycle³⁰ with fixed rotations and rights in a territory³¹ indicates a permanent form of agriculture which implies more attention to sustainability than modern mono-cropping systems.

The demise of shifting cultivation in Thailand appears to be by intent rather than a result of rising population. Opium, long an income earner for government and eventually monopolised under Rama IV providing more than 20 percent of revenues at times, had been outlawed and reinstated periodically,³² until in 1957 it was finally made illegal. This stimulated covert plantings as well as alternative crop projects sponsored in many cases by interested foreign governments.³³ Projects met with minor successes until roads made perishable and bulky alternative crops economic, and facilitated policing, albeit within a corrupted system.³⁴ The expansion of opium and rise of population led to uncontrolled fires, expansion of grasslands,³⁵ and large changes in highland vegetation,³⁶ which contrary to some accounts was not almost bare in the 1940s.³⁷ The lack of knowledge about sustainable agriculture in the highlands is further illustrated by late interest in native tea of the region despite its use in neighbouring Yunnan province, its ecological suitability for development,³⁸ and the existence of a related industry producing a chewed fermented tea product.³⁹ Viable yet neglected, highland agriculture was quite the antithesis of the growth of Thai agribusiness and government interests of the day.

²⁹ Rerkasem, Kanok. (1997)

³⁰ Conklin, H.C. (1957)

³¹ Grandstaff, T.B. (1980a)

³² Thomson, V. (1967)

³³ AIDAB (1976)

³⁴ McCoy, A.W. (1972)

³⁵ Falvey, L. (1981b)

³⁶ Santisuk, T. (1988)

³⁷ Thomson, V. (1967)

³⁸ van Roy, E. (1971)

³⁹ McCarthy, J. (1902)

Agribusiness and The State

The agribusiness of European traders investing in Thai infrastructure⁴⁰ and processing, and in particular, entrepreneurial activities of Chinese at all levels, was checked through the 1930s depression and Thai political changes in 1932. The definite arrival of a new agribusiness sector is clear from the late 1930s when the subsistence-plus-surplus farmer was overshadowed by policy emphases on commercial chains controlled by agribusinessmen and, to an extent, State enterprises. State enterprises were created as a post-1932 mechanism to control perceived dominance of European business in the mood of Thai economic nationalism.⁴¹

Large rice exporting businesses of Chinese groups evolved to control the rice trade using networks of up-country Chinese and other traders to extract product from rural areas with increasing efficiency. Government condoned the approach through building of communication systems to suit the network which in turn allowed traders to consolidate their middleman role in buying and selling paddy, lending money, renting land, selling consumable items, and crop-futures trading. Relying on this system, government sought larger surpluses from agricultural areas to fund urban and industrial development through the 1950s. By this time, government had nationalised rice trading and taxed production, ostensibly to meet World War II reparation responsibilities payable as rice. The tax on producers to fund the free rice proved easy to retain after the reparation period, thereby providing windfall income from the diverging procurement and export prices. Administratively simple, the tax produced 32 percent of government revenue by 1953.⁴²

Challenging European trading houses, Chinese established local production facilities for utilitarian items including; ice, bottled water, soap, cooking oil, processed foods, matches, cigarettes, animal feed, beer, textiles, and household equipment. Entrepreneurs originated among migrant Chinese who had gained knowledge, contacts and confidence in the changing system, and who commanded strong local community support for financing, market development, and expansion. As they grew in confidence, they lobbied government in subtly acceptable ways to

⁴⁰ Owen, N.G. (1971)

⁴¹ Terwiel, B.J. (1991)

⁴² Phongpaichit, Pasuk. and Baker, C. (1997)

assist agricultural industries, with the expectation, and result, that this was nationally important. While commercial groups had been largely silent through the 1932 revolution, the result suited their purposes, as some later indicated by retrospectively loyal contributions. In rural areas, middlemen promoted development more effectively than government programs as they controlled virtually all inputs and markets for the only viable products. In the Northeast, for example, they advanced future crop receipts to settlers, allocated new lands, and supplied essential tools and inputs for cassava for which they invested in drying floors, warehouses, processing facilities, and trading networks.⁴³

Roads essential to this agribusiness boom were built by government and USA military related assistance; paved roads rose from less than 1,000 kilometres in 1950 to more than 22,000 by 1980, often in association with malaria eradication programs which allowed uninhabited uplands to be brought into production. Upland cash crops highlighted the private benefit able to be captured by a few trading networks, and inevitably led to government concern about middlemen. One response was the Bank of Agriculture and Agricultural Cooperatives, created in 1966 when Green Revolution technologies increased demand for credit to fund pesticides, fertilisers, and tractors and other small equipment. Commercial banks were required to allocate five percent of lending to agriculture in 1975 and 13 percent in 1979, further favouring larger producers and those with clear land titles. The profile of rice farmers changed from small owner-operators; for example, in the Central Plain by the 1980s, independent cultivators comprised about 40 percent of rice producers with lots of 15 to 40 rai (2.4 to 6.4 hectare) in a mixed commercial and subsistence system, non-farming landlords with tracts exceeding 40 rai (6.4 hectare) comprised 30 percent, and landless labour and small-holders who relied on off-farm income comprised 30 percent.⁴⁴

Chinese agribusinessmen adapted to military and government assumption of their monopolies. Creating their own processing facilities, the military promoted a benevolent Thai face of assisting rural dwellers. To assist the process, Chinese immigration was restricted, the Thai Rice Company was formed to operate rice mills to which middlemen were required to send their paddy, and distribution

⁴³ Phongpaichit, Pasuk. and Baker, C. (1997)

⁴⁴ Douglass, M. (1984)

mechanisms such as the Thai *Niyom Panich* company were established. From this era, government-owned and run abattoirs, tobacco, sugar, cassava, and kenaf sack processing organisations came into existence forming part of the complex agribusiness tapestry of today. Pridi, after exile necessitated from his post-1932 economic plan, used his expertise in capital formation for the government to joint venture with Chinese business houses while the military pursued its economic nationalism approach. The agribusiness groups, Wanglee, Lamsam, and Bulasuk, for example, became integral to government agribusiness activities with a small and public elite being represented on the boards of major national assets.⁴⁵ As power shifted to the military in 1947, board memberships shifted from Chinese businessmen to generals, although the military retained business arrangements with, and respect for, the Chinese businessmen.

Of the Chinese groups which enjoyed commercial success, the seed, fertiliser, and general agricultural input importer Charoen Pokaphand (CP) emerged as a giant. Expanding into animal feed milling in the 1960s, it joint-ventured with the USA poultry group Arbor Acres to introduce parent stock to the Thai chicken industry in the 1970s.⁴⁶ By 1973 it deftly assumed slaughter and processing control from the government's monopoly, and introduced a CP-controlled contract farming system. CP supplied chicks, purchased and processed grown birds, and marketed chicken meat products. The approach was extended to pigs, and markets were extended into Asia particularly Japan, Indonesia, Singapore, Taiwan, Malaysia, and latterly China, where it emerged as a force similar to the USA agribusiness giant Cargill. Diversifying into communications, transport, finance, and convenience stores among other ventures, the conglomerate maintained close connections with government line agencies and politicians.

A case study in agribusiness, CP also indicates the source of Thai wealth, agriculture. Through recent economic setbacks, the group has returned to this principle generator of wealth to cover losses in other sectors. In some ways, CP as a surrogate for the evolved Chinese-Thai agribusiness groups, can be viewed as a quasi-arm of government, and certainly a critical part of Thai agriculture. However, this viewpoint highlights a need for equitable distribution of benefits across the

⁴⁵ Phongpaichit, Pasuk. and Baker, C. (1997)

⁴⁶ Phongpaichit, Pasuk. and Baker, C. (1997)

sector, which remains a role of government rather than agribusiness.

The State and agribusiness have been linked through various mechanisms since the 1950s. Interpreted by some foreign observers as a corrupt system, it may better be seen as a continuation of the Thai approach of co-existence, easy integration of foreigners to become Thai, and a means of using available expertise in a developing economy. It may also be seen as a continuation of a long term approach of harvesting resources from rural areas where marginalised producers increasingly are forced into environmental unsound practices to the increasing concern of Thailand's trading partners. However, a primary focus of environmental concern has been dams and water distribution systems.

The Culture of Irrigation

The recently renamed Royal Irrigation Department began its post 1932 works in the North. The Mae Faek Dam on the Ping River was completed in 1935 followed by three others in the area to irrigate some 50,000 hectare, about 30 percent of the Chiang Mai-Lampun valley. By 1939, ancient wooden weirs built on the Tai *muang fai* system were abolished to assist the new irrigation system's overall function.⁴⁷ The limits of the old system had probably been reached with the continuing push to irrigate more land and to double crop. Nevertheless, the new integrated irrigation system was part of an ecologically costly package of high chemical applications, and major interruption of aquatic environments.

The demise of traditional systems through the post-1932 modernisation is an indication of global forces and the willingness of the State to utilise new means to ensure continued flow of revenue. The Peoples' Irrigation Act of 1939 attempted to replace older social and water management structures with water-user groups, although it was unsuccessful until embodied in the National Irrigation Act of 1942. In fact, traditional *muang fai* and national systems worked side by side in the North until the 1960s, when pressure to conform became overwhelming in the face of limited water-use choices for small traditional schemes surrounded by the national system. By then, the high maintenance and replacement costs of the traditional weirs was also a disincentive. The baby of millennia-old cultural practices was thrown out with old irrigation water in a generational change in

⁴⁷ van Beek, S. (1995)

beliefs observances, myths, and locally enforced rules. Government officials assisted this modernising influence through irrigation committees where their status transcended the traditional path to local power for villagers from water manager to headmen of the *tambol*.

Meanwhile in the delta, government invested in irrigation from the 1950s following an FAO/World Bank plan reminiscent of the van der Heide plan of 1906. Solving the ancient Ayutthaya bugbear of flooding was invoked as one the benefits of the investment.⁴⁸ The northern delta Chai Nat Dam completed in 1957 was key to the plan, although its impact was low until canals were dug and the multi-purpose Bhumibol and Sirikit Dams built in 1964 and 1971 respectively.⁴⁹ Multilateral assistance for these dams was part of the Green Revolution requirement for a managed aquatic environment for high yielding rice varieties. In the event, Thailand was able to maintain a less intensive agriculture than its neighbours as a result of its land availability and surplus production, as well as government's distraction by industrialisation. The environmental impact of agriculture in Thailand warrants further research.

Environmental Change

The rapid technological change from 1932 through the 1980s has caused higher environmental impacts than the less intensive systems of earlier eras. However, there has been no sudden Green Revolution attack on the natural environment. Trends well established from Ayutthaya and earlier would have created at least similar impact under rising population and production demands. The example of the sustainability of shifting agriculture systems under low population density regimes is apposite; similarly, wet rice produced under small scale irrigation schemes is apparently sustainable until greater outputs are required from the system. Even the millennia-old *muang fai* irrigation system exceeded environmental tolerance under the production demands of 1975 when a flood necessitated a *fai* replacement cost of 8,000 trees for poles⁵⁰ from declining forest reserves.

⁴⁸ van Beek, S. (1995)

⁴⁹ Arbhabhirama, Anat. et al (1988)

⁵⁰ van Beek, S. (1995)

However, small-holder agriculturists did not destroy the Thai forests; they were simply pawns to agribusiness, government, military, and associated influential persons' aspirations. Such forest losses are the common environmental indicator of the past five decades in Thailand. Competing policies indicate the overriding primacy of nation building and political stability through the period, such that even to the 1960s, insurgent groups resident in forests were controlled by road construction which in turn facilitated further illegal logging. Forest concessionaires, nominally required to replant forests in return for 30 year cutting rights in the 1960s, exacerbated an existing problem, delaying any possible solution until the 1990s. Once associated with forests, but now increasingly with agriculture, fire is also a significant influence in changes to the atmospheric environment.⁵¹

The environmental impacts of the period include:⁵²

- large scale conversion of forest to crop land
- chemical and physical decline of upland soils, demonstrated through declining yields especially in the first two years after clearing
- expansion of the area covered by the fire resistant rhizomatous grass, *Imperata cylindrica*
- soil compaction from the introduction of tractors, especially on waterlogged soils
- widespread planting of highly efficient nutrient extracting crops, such as cassava, on poor soils
- erosion in the highlands, uplands, and along water courses
- increased management by fire in lowland, upland, and highland agriculture, with resultant loss of nutrients and organic mater, and increased air pollution
- changes in the water harvesting and releasing characteristics of watersheds, with higher peak river flows and flooding, and lower dry season flows and a greater need for dams
- sedimentation of dams
- loss of biological resources through adoption of high yielding varieties for crops, and habitat destruction
- groundwater pollution from fertilisers and pesticides.

⁵¹ Kaosaard, Minsarn. and Rerkasem, Benjawan. (1999)

⁵² ADB (1999)

All of these impacts are common to other countries. Some of the solutions will come from the same foreign sources, although there are few extractable financial benefits associated with remediation and research specific to a local environment. These remain a major challenges of the Thai government. This modified environment, and Thailand's human resources, form the base for today's Thai agriculture.

Summary

Key points pertinent to Thai agriculture which may be elicited from consideration of the post-1932 period include:

- Expansion of agricultural lands supported rapid population increase and agricultural output, until accessible easily farmed land was expended and world agricultural prices fell; subsequent increases in agricultural output were achieved through intensification using Green Revolution technologies including irrigation which, with forest disappearance, raised environmental concerns.
- New agribusiness forces emerged, which aligned closely with government to assist national objectives of increased revenues from agriculture to fund industrialisation policies that assumed continued small-holder resilience to tax and isolation from the social and economic benefits of progress, with agriculture providing a welfare role as it increasingly became associated with rural poverty.
- Thailand emerged as one of the world's few agricultural exporting countries, with agricultural receipts funding national development and redeeming the economy in times of crisis, while being decreasingly understood by national decision-makers in terms of inherent benefits to the country, past sustainable systems, and emerging social and economic issues in a sector inextricably linked to the global economy.