Agriculture in Thailand at the Cross-Road.

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Since the inception of the First National Economic and Social Development Plan in 1961, agriculture in Thailand was deliberately planned by the Thai Government to generate foreign exchange earnings needed to stimulate industrial development through import-substitution policy at least until 1976. Monoculture was introduced to replace the traditional practice of self-sufficient farming while domestic prices were kept at perpetually low level through various forms of export tax in order to generate income for the government as well as to keep the labour cost of production at low level to be conducive for industrial development.

Agriculture in Thailand is now at the cross-road as to whether the Thai Government should promote the expansion of these new forms of agriculture to provide strong economic bases for small farmers as well as national economic and social security. At the same time, it should continue supporting the agro-industries basically for export, when there is no conflict of interest in terms of resources and environment between the two forms of agricultural practices.

Agriculture in Thailand until 1976

Before the launch of the First National Economic Development Plan in 1961, Thailand was basically an agrarian society. In 1960, more than 80 per cent of the country's population was still in the agricultural sector, with agricultural products accounting for 36.7 per cent of the GDP, while the size of the GDP then was only US$20 billion at current price (Suchinda 1995, p. 10). Foreign exchange earnings were generated by narrow ranges of primary products. They were basically rice, tin, rubber and teak. The country was, and is still, basically self-sufficient in food and other related agricultural products. The National Economic and Social Development Plans (as they were later called) since their inception in 1961 until the Seventh one (1992–96) placed strong emphasis on rapid expansion through industrialization. As a result, the agricultural sector has been made subservient to that of industry deliberately through the national development policy. There has been considerable shift in the emphasis in the Eighth National Economic and Social Development Plan (1997–2001). The human factor is made central to all national development efforts. Much more emphasis is now placed on the improvement in quality of life of the underprivileged as well as on sustainable development.

Although industrial and service sectors were

the country's ultimate development goal, foreign exchange earnings from the agricultural sector was a prerequisite for the said development objective. From the inception of the First Plan, diversification of agricultural products were made for exports from three items, namely rice, rubber and teak. The new products included upland crops such as jute, maize, sugar-cane and cassava. Unfortunately, newly diversified products were achieved at the cost of more destruction of virgin forest lands, and the farming method adopted was basically monoculture. Consequently, additional foreign exchange earnings were gained at the cost of rapid destruction of forest lands and rapid deterioration in the quality and quantity of water supply as well as quality of soil suitable for agriculture due mainly to soil erosion. It was estimated that the annual rate of top soil loss from monoculture for upland crops in Thailand ranges from 25 tons to 75 tons per acre per year depending on the amount of rainfall and soil coverage by plants (Tongpan 1995, p. 41). As a result, yield per area has been reduced progressively by time. For example a five-centimeter loss of top soil will result in 22 per cent reduction of corn production, and 15-centimeter loss of top soil will result in 50 per cent production loss, accordingly (Tongpan 1995, p. 41).

In spite of such long-term undesirable consequences, the rapid increase in cultivable areas resulted in absolute increase in agricultural products. For example in 1961 while forest occupied 53.3 per cent of the country's land area, the agricultural land constituted only 23 per cent of the total area. By 1967, the forest area was reduced to 48 per cent of the land area, while the agricultural land was increased to 28 per cent. In that year, the Thai Government responded by further adjusting the policy to maintain the forest area from 50 per cent of the total land area in 1961 to only 40 per cent in order to give way to more expansion of agricultural area. With the adjusted policy, in 1968 the Thai Government decided to renew the expired concessions given to lumber companies in over 500 forests (Puntasen 1994, p. 2). This action was consistent with the policy to continue earning foreign exchange through exports of timber as well more export of agricultural products through increased agricultural land.

Throughout the 1960s and 1970s, more varieties of cash crops were produced. By the end of the 1960s, Thailand had emerged as a major food surplus country of the world, and the only one in Asia at the time, ranking fifth as a world food supplier after the United States, Canada, Australia and France (Suchinda 1995, p. 40). Although the agricultural sector in Thailand performed fairly well at the national level during the said period, the living conditions of the Thai farmers were much worse off than their counterparts in the industrial and service sectors. Apart from being a relatively slower growth sector, the Thai Government deliberately designed a strongly-biased policy in favour of the industrial sector at the expense of the agricultural sector through various forms of tax and incentive schemes as well as a specific exchange rate policy.

At least until 1975, industrial development policy in Thailand was through import-substitution industries. While various tax incentives as well as other forms of promotional privileges were offered to the industries, farm prices were heavily suppressed by various forms of export taxes on agricultural products. The most notorious one was a flexible but rather high rate of export tax on rice known as rice premium. In addition to severely depressing farm prices, the exchange rate between the U.S. dollar and the Thai baht was pegged at too low a level for too long (only in 1984 was the baht currency pegged to a basket of foreign exchanges dominated by the U.S. dollar, about 80 per cent of the basket). At the time when most imports were industrial products while most exports were agricultural products, this exchange rate policy would work in favour of urban industrialists and consumers while it severely penalized rural farmers. At the same time a trade monopoly on agricultural inputs raised the cost of production for farmers further.

The logic for implementing such a strongly biased policy against the Thai farmers was solely to stimulate industrial growth. Since in practice import-substitution industries must import almost everything ranging from raw materials,

machineries as well as expert services, rapid growth of the sectors resulted in heavy drain of foreign exchange. One way to compensate for such a severe drain was to earn a good proportion of foreign exchange through exports of agricultural products. Since income tax then had a very narrow base and the government must provide tax exemption to capital and raw materials under industrial promotion schemes, the other easy way to raise the government revenue for infrastructure investment that would further benefit industries was through collecting taxes from agricultural exports. Pegging the exchange rate at too low a level would contribute to the stabilization of urban consumer prices. Depressing farm prices by severely taxing exports of agricultural products would reinforce the stability of urban consumer prices even more. As a result, the government was quite successful in controlling the inflation rate within the range of five per cent for long periods of time except for the unusual periods of oil price crises during 1973–74 and 1979–80. Maintaining a low level of farm prices also implied the maintenance of low labour cost, a good environment factor conducive for the promotion of labour-intensive industries.

As a result of this deliberate policy, the Thai farmers were kept in perpetual poverty. On top of that, since import-substitution industries only applied [to] capital-intensive technology imported from much more advanced countries, they did not generate employment proportionately to the expansion of the sector. Only a small fraction of extra labour could be absorbed by the sector in spite of the very low labour cost. The extra ones released from the agricultural sector faced very high chances of being urban unemployed. There was a growing pressure for a swelling population in rural area to opt for new cultivating land taken from unoccupied forest land. The situation resulted in continual expansion of agricultural land at the cost of rapid reduction of the country's forest areas.

At the same time the income gap between those in non-agricultural sectors and the ones in the agricultural sector widened.

Further Development up to 1986

The period 1977–86 was under the Fourth and the Fifth National Economic and Social Development Plans. This period also signified the impasse of the policy of import-substitution industries due to the saturation of the domestic market together with their inability to meet the challenge to export resulting from their inefficiency caused by their monopoly privilege. At the same time, rural poverty caused by consequentially imbalanced development policies became clearly evident. Intensified political struggle as well as armed struggle led by the Communist Party of Thailand against the military dictatorial regime was also at their peak, especially, during 1978–80. The situation was also intensified by the second oil price crisis in 1979/80. Obviously, the whole situation required rethinking and restructuring of the policy in order to overcome such crises. Two major policies were implemented during the said period: the introduction of export-oriented policy in the Fourth Plan and the overhaul of rural development policy and practice in the Fifth Plan.

In order to summarize what had taken place in Thailand during 1961–86, the following figures of sectional growth during the five planning periods clearly reflect the series of development discussed above.

Table 1 clearly indicates rapid expansion of the three sectors during the First Plan (1961–66). The industrial sector took the lead with the average annual rate of growth of 11.8 per cent, followed by that of service with the average annual rate of growth of 9.4 per cent and that of agriculture of 7.6 per cent, the highest rate recorded for the sector, accordingly. During the Second and the Third Plans, the industrial sector was still performing very well, followed as usual by relatively good performance of the service sector. As expected, as most of the areas best suited for agriculture were already taken from the virgin forest for this purpose, the sectional growth rate declined significantly. The average annual growth rate of the industrial sectors during the Fourth and the Fifth Plans clearly reflect the fact that the policy of import-substitution industries had gradually

TABLE 1
Annual Growth Rate of GDP by Major Economic Sectors

Development Plan	*Agriculture*	*Industry*	*Service*
First Plan (1961–66)	7.6	11.8	9.4
Second Plan (1967–71)	4.2	10.4	6.3
Third Plan (1972–76)	4.2	11.3	7.8
Fourth Plan (1977–81)	4.0	8.1	8.3
Fifth Plan (1982–86)	3.9	5.6	5.6

SOURCE: The National Economic and Social Development Board (1991).

reached the impasse. At the same time, the sectoral growth rate of the agricultural sector exhibits a clear pattern of steady decline.

When rural poverty artificially created by deliberate government policy brought about resistance by the rural poor led by the Communist Party of Thailand, the government responded with strong military repression. More roads were built all over the country to bring troops and supplies to quell resistance, particularly for the Northeast. New roads that cut through the virgin forests had brought about new areas for cultivation purpose. Unfortunately, most of the large parcels of land along the new roads were in the ownership of Bangkok élites and their local clients. Consequently, the resettlement of landless farmers had to take place in the areas of afforestation. Since monoculture is the obvious method to exploit the land at its optimal productivity in the short run, most of the new lands were put to use for this purpose. This practice has resulted in rapid degradation in soil fertility with severe repercussions on long-term quality of farm land.

This form of agricultural practice is very different from the traditional method of self-sufficient farming practised by most small farmers in Thailand before the introduction of the National Economic Development Planning in 1961. In self-sufficiency farming, farmers grow everything for their own families' consumption. The main objective is to become self-sufficient with minimal reliance on external markets. With this method of farming practice, farmers cannot expect quick improvement in their economic status. On the other hand, they are not at the mercy of the market for their products. For most small farmers, they normally end up being losers resulting from their minimal bargaining power. In the longer run, it would be to their own advantage for small farmers to adopt the farming method of self-sufficiency. Not only would such method of farming practice benefit small farmers economically in the longer run, it would also yield better ecological result locally as well as globally than that of monoculture.

It is worthy to note that self-sufficient farming requires the availability of forest products for the provision of wood for shelter and fuel, herbal medicines and some natural food supplies. Without forests these needs can only be met through the markets, and the only way to have access to such markets is with cash. The rapid disappearance of forest land therefore contributed to the change from self-sufficient farming to cash crop farming and monoculture. Through the series of related mechanisms discussed, starting from strong encouragement by the Thai Government for farmers to switch from self-sufficient farming to cash crop farming and monoculture as well as to increase the area of farm lands at the expense of rapid reduction of forest land, the end result was that most small farmers were compelled to follow such a course of development. In the end, such practice resulted in the shattering of their families and their lives, rapid degradation of soil and water resources as well as rapid deterioration in ecological balance and the environment.

Fortunately some brighter aspects also evolved for industry. After the long stagnation of wage rates which resulted from the deliberate policy of

the then government to impoverish farmers, labour-intensive, export-oriented industries actually began to have the advantage over some of the products from the newly-industralized Asian countries. Consequently, in the Fourth Plan, there was a strong emphasis on an export-oriented policy. However, the actual development of these industries did not take place until the early 1980s, at the very end of the period of this Plan: not a good time to start because of the global recession resulting from the second oil price shock of 1979/80. Nevertheless, the strong emergence of the agro-industry in the mid-1970s, the transfer of technological processes from the import-substitution industries, especially management technology, the large pool of high quality, cheap labour following the rapid expansion of primary education and the gaining of work experience, and, finally, the supply of cheap raw materials from the increasing practice of monoculture among small farmers were the basic ingredients for the expansion of export industries by the time the global economy was revived in 1983 after the few years of recession. The conclusion of the Plaza Accord in 1985 resulted in the outburst of capital flow from Japan and other Asian NICs into Thailand during 1987–90. The aim was to use Thailand as a production base for re-exporting. Consequently, exports from Thailand were stimulated by such factors further.

Plagued by severe problems of rural poverty caused by a series of policies that worked against the rural poor forced the Thai Government to rethink and revise its rural development policy. The evidence was very clear especially during the slow growth period of 1981–85. According to the study of the Thailand Development Research Institute, the incidence of poverty in Thai villages was actually on the increase in all regions in Thailand. Both level of poverty and the rate of increase were highest in the Northeast, where poverty rose from 36 per cent to over 48 per cent. In the South it rose from 22 per cent to 31 per cent. The average size of land holdings was increasing: over a twenty-year period from 1963–83, the percentage of farms of four acres or less declined from over 33 per cent to under 7 per cent, while those of more than sixteen acres doubled from just over 20 per cent. Mono-cropping and agro-industry were the reasons for this change. Those who were able to keep abreast of the new technology normally did well and were able to increase their holdings. Those who were unsuccessful must sell their land and either migrate to the cities for employment or became part of the rural proletariat. This latter group, by definition those who own up to an acre of land, increased significantly. The 1987 statistics revealed by the National Economic and Social Development Board show that one-quarter of the rural population fell within this category.

Before the Fifth Plan, what it called a "rural development programme" was in fact a policy of counter-insurgency based on psychological warfare against the spread of communism in the rural area. The Fifth Plan was the first one of its kind with the aim to reduce poverty incidence among the rural population through the five principles of integrated rural development (Suchinda 1995, p. 41):

1. Stressing on areas with high incidence of poverty.
2. Developing the standard of living of people in these areas so that they would be able to receive basic minimum services.
3. Emphasizing a self-help principle.
4. Emphasizing the utilization of appropriate technology.
5. Encouraging people to solve their own problems.

For the first time such a development effort was promoted on a nation-wide basis. A new responsible body, the National Rural Development Committee, was originated to deal with the problems systematically. Six ministries, Interior, Education, Public Health, Agriculture and Cooperative, Commerce, and Industry, were called to work under the co-ordination of that committee for more efficiency in their joint efforts. In spite of good intentions, the system of centralized control reinforced by heavy bureaucratization and the natural complexity of actual problems reduced

the chance for success significantly. Nevertheless, the new policy did provide greater opportunity for people to solve problems on their own or with the help of newly-formed or existing people organizations and the non-governmental organizations (NGOs). The latter aspect of the policy did result in some improvement in the livelihood of the rural population.

Various Forms of Eco-farming as Solutions

Having their own survival threatened through their practices of monoculture, small farmers were forced to reconsider their own farming methods. Self-sufficient farming came back to them naturally. Unfortunately, the practice of self-sufficient farming was not enough for small farmers to survive under the changing environment. The contemporary environment has been such that the forests around their farm lands that used to fertilize their lands and to provide complementary necessities for their needs were no longer there. Also, there has been increasing needs for additional non-farm products resulting from the contemporary change in lifestyle brought by the coming age of globalization. At the same time, their existing pieces of land of similar size to what they had had in the past were in much poorer quality. None the less, a cardinal principle of self-sufficient farming in producing for a family's needs first is still a correct one. The only improvement on this idea is how to improve the efficiency and productivity of the existing pieces of land, as well as the soil quality. Under such circumstances, the concept of eco-farming fits in naturally.

Within this broad concept of eco-farming, there are various forms for practical application. Among them are natural farming, organic farming, integrated farming, forest agriculture, Kyusei natural farming and MOA nature farming (Puangsomlee 1995, pp. 68–72). Many of these farming ideas originated in Japan where the average size of farm land is rather small (around one or two acres), with intensive utilization of chemical fertilizers, herbicides and insecticides in the past and continue to be so in most areas. *Natural farming* is the system of do-nothing agriculture. The main idea is to reduce unnecessary intervention by human beings to the minimal. The only necessary intervention required is the planning in order to optimize the utilization of land through the natural processes of plants complementarily, recycling of plant nutrients with great stress on ecological balance and plant dynamism. *Organic farming* puts greater emphasis on abstaining from all kinds of chemical usage in farming practice. Food nutrients for plants are obtained from related organic materials mostly available in the farm. Pest control is done through the technique of integrated pest management.

Integrated farming is a farming technique emphasizing complementary animal husbandry and growing plants such that part of the plant products or waste can be used for animal feed, and waste from animals become plant food. *Forest agriculture* is a form of organizing plants in a forest setting. The only difference between natural forest and the forest agriculture is that in natural forest not every plant is of immediate usefulness to humans. Since forest agriculture is a man-made forest, in order to make optimal use of limited amount of land, complementary plants, all with economic value to humans, must be selected carefully. *Kyusei natural farming* puts greater emphasis on the utilization of effective microorganism (EM), for the quick improvement of soil fertility as well as for pest control resulting from long utilization of land for monoculture. *MOA nature farming* put greater emphasis on producing healthy food mostly through natural methods applying various techniques to improve plant nutrients as well as the control of competing plants and pests.

All these alternative farming techniques share one common principle not needed by self-sufficient farming. They require additional input in order to optimize the utilization of limited poor quality land that is knowledge intensive. This form of input cannot be provided by outsiders. It must be gradually accumulated, created, and generated by the farmers themselves. This factor explains why it is rather difficult for individual farmers to switch from traditional practice to

various forms of alternative farming. Fortunately, the learning process can be shortened through the demonstration of a clearly successful case. This is how eco-farming originated and spread in Thailand recently.

In Thailand, the more common forms of eco-farming adopted by most small farmers are integrated farming and forest agriculture basically because they originated from the Thai farmers themselves, and are well suited to the physical, geographical and economic environment as well as the existing level of technological development. Forest agriculture, named by Vibul Khemchalerm who is a pioneer in Thailand in this field, is a method of growing all economic plants in a forest setting (Puntasen 1992, p. 103). The economic rationale behind his idea is that normally all plants that survive within the setting of a natural forest are complementing each other. Collectively, they also provide ecological balance, which is highly valuable for all creatures living in the forest as well as humans living around the area. No outside intervention such as fertilizers and pesticides are needed. The only unfortunate part as far as humans are concerned is that the forest does not exist to serve the needs of humans only. Plants and all living things in the forest are designed to meet the needs of all living entities dwelling there. This situation creates an opportunity cost in the harvesting time for humans searching for useful plants in the forest.

Theoretically, if humans can artificially create similar forest settings in their own backyard but only select those plants with economic value, the opportunity cost in terms of time searching for the proper plant will reduce significantly. At the same time, growing plants in the form of a forest setting is also the most efficient way to utilize the land for agricultural purpose since there will be virtually no waste in the land space being used. This conceptual framework has been practised in Thailand in the last 10 years. The results have been variable depending very much on the appropriateness of selected geographical location, the determination and the ability to endure the transitional period from that of cash crop farmers to forest agricultural farmers. The most important factor, however, is the level of intellectual ability of those who adopted this farming method. As already discussed earlier, all unfavourable circumstances must be substituted by the new input, namely, intellectual ability.

The second form of eco-farming widely practised in Thailand is integrated farming. This farming practice has been pioneered in Thailand by Maha Yu Soonthornthai at about the same time as Vibul Khemchalerm. A theoretical concept for this farming practice is to organize several production processes at the same time, using the waste and, perhaps, product from one process as input into other processes. This way one can have the most efficient set of production processes, because there is virtually no waste coming out from the whole system. A case to demonstrate as an example is the one adopted by Maha Yu himself. He has raised pigs, ducks and chickens as well as fish in the rice field. He grew rice, as well as fruit trees and vegetable. He fed his pigs rice husk, rice bran and broken rice, by-products from his rice production, as well as some unused vegetables. Pig urine is collected to be used as fertilizer and their secretion can be used as fish feed. Fish, on the other hand, are raised in the rice field. Fish eat insects that can be harmful to rice and secretions from the fish help fertilize rice plants. Ducks are also raised in the rice field. Ducks eat some small fish but also eat crabs, and pests of young rice plants. Ducks' secretion also fertilize rice plants. Fruit trees provide fruits, and shade for vegetable and shade for fish in the pond. Both fruit trees and vegetables need significant amounts of water daily that can be supplied from the fish ponds. Remaining waste from vegetable and other plants can be used as humus to fertilize all plants, and as fish feed.

The success of this farming method can be clearly exemplified. The most difficult part in following such an example is again the transformation process from that of mono-cropping to integrated farming. Another necessary input required is intellectual ability. However, this method of farming can take many forms and the concept is less abstract than that of forest agriculture. The method can be adopted in most geographical

locations. Not surprisingly, this farming method is much more widely adopted by small farmers in Thailand.

The discussion in this section demonstrates the dynamism of farming methods practised in Thailand. A rather recent development of eco-farming in Thailand has been in response to the failure of the practice of monoculture by small farmers in the face of the quick disappearance of forest lands, which threatens their basic survival. Rapid increase in popularity of the eco-farming practice in Thailand recently is mainly because it provides a satisfactory way out from such threats. The current limitations are intellectual ability of the farmers themselves and the ability to endure more hardship during the transitional process.

Current Status of Agriculture in Thailand

Before the end of the Fifth National Economic and Social Development Plan in 1986, significant change took place not only within the Thai economy but especially among the so called ASEAN-4 comprising Indonesia, Malaysia, the Philippines and Thailand. Economic slow-down especially during 1984–85 provided significant impetus for most countries in the region to switch to export-oriented industrialization policy, a very important change in attitude more in line with trade liberalization policy that otherwise would not have been possible (Akrasanee 1987, p. 99). This change was actually responsible for the birth of the ASEAN Free Trade Area (AFTA) in January 1993.

The change in attitude among those nations alone would not have amounted to any effective change without the additional event of the September 1985 Plaza Accord followed by the summit of the G-5 nations in Tokyo that resulted in very rapid appreciation of the yen. Consequently, there has been rapid influx of direct foreign investment into the region from Japan as well as from the Asian newly industrialized economies (NIEs). Such massive influx of foreign direct investment (FDI) generated at least three favourable conditions: accessibility of more markets for exports; stimulation of technological transfer; and generation of intra-regional trade resulting from production plans by multinational corporations, as well as different levels of technological intensity among different countries in the region brought about by the FDI. The end result of such favourable conditions was rapid expansion of the industrial sectors for most ASEAN countries.

During 1987–93, the accumulated FDI per capita was US$728, the third highest ranking after Singapore and Malaysia whose accumulated FDI per capita during the same period was US$4,105 and US$1,550, respectively. (Puntasen, Kuwamori and Wongtip 1995, p. 14). As a result, the Thai economy started to emerge from the 1985 recession with the growth rate of only 3.1 per cent, the lowest growth record of the Thai economy since 1961, to the rate of 4.5 per cent in 1986. Since then the growth record for the Thai economy until the recent depression (since 1996) was rather impressive. The rate increases to 9.5 per cent in 1987 and increases further to 13.3 per cent in 1988 before slowing down to 11.9 per cent in both 1989 and 1990. During the entire period of 1987–92, with the exception of 1988 and 1989, the growth rates of the agricultural sector were also high, although the growth rates of the industrial sector took the lead followed by that of service sectors (Table 2).

It should be noted that a considerably high rate of growth of the agricultural sector in 1985 was due to significant improvement in world prices of agricultural products after a long series of decline since 1980; the agricultural sector's growth also contributed to the overall growth rate of the GDP of 3.1 per cent in spite of the very poor performance of the industrial sector (–1 per cent) in that year. However, during the turnaround period as FDI started to flow into the country in 1986, the industrial sector took the lead, propelled by two leading subsectors, manufacturing and construction. The construction boom during the said period was in turn fuelled by the real estate boom resulting from the rapid inflow of FDI, the same factor that also explained the rapid expansion of the manufacturing sector.

This development experience led the Thai

TABLE 2
GDP Growth Rate

	1985	*1986*	*1987*	*1988*	*1989*	*1990*	*1991*	*1992*	*1993*	*1994*	*1995*
1. Gross Domestic Product	3.1	4.5	9.5	13.3	11.9	11.9	8.1	8.1	8.3	8.7	6.8
2. By Industry											
Agricultural Sector	6.6	0.2	0.1	10.5	8.0	–2.3	5.0	4.0	–1.9	4.2	2.5
Industrial Sector	–1.0	7.1	14.1	16.4	17.5	16.3	11.9	10.6	11.6	12.6	9.4
Manufacturing	–0.6	9.6	16.0	17.9	16.0	16.0	11.8	11.3	11.1	12.1	9.8
Construction	–5.2	–2.9	9.8	12.7	28.3	22.0	11.9	4.7	9.5	8.2	6.4
Service Sector	4.6	4.5	10.0	12.1	9.3	13.1	5.9	7.2	4.5	4.9	4.3
Transportation & Communication	4.1	7.2	9.3	15.9	10.4	14.0	7.0	10.5	9.3	10.4	7.9
Wholesale & Retail	3.4	4.5	10.9	15.8	11.5	14.9	6.8	3.2	8.5	7.8	6.1
Banking, Insurance & Real Estate	3.4	3.1	31.5	27.8	21.5	34.4	4.6	25.7	22.7	14.0	8.3

SOURCE: National Income of Thailand, Rebased Series, 1980–91.

economy to the point of becoming a newly industrialized economy of Asia. In the early 1990s, global attention was focused on the Thai economy as the "fifth tiger" of Asia after the four other Asian NIEs, namely, Korea, Taiwan, Hong Kong, and Singapore. There is the new question of whether Thailand should continue to rely upon its agricultural base where more than 50 per cent of its population still earn a significant part of their livelihood from it in 1995. Such development resulted in the necessity for re-examining a strategy for agricultural development within the context of the overall national development strategies. Agriculture in Thailand was at the cross-roads. Fortunately, or unfortunately, since 1966 liquidity has become a serious problem for production of manufacturing goods for export together with the high import cost resulting from the devaluation of the baht, and a self-reliant strategy for most small farmers in Thailand has become a must rather than an option.

Rapid Structural Change

Since 1986, there has been rapid structural change for the Thai economy in the reduced significance of the agricultural sector. One major explainable factor is the rapid influx of FDI during 1986–92 with two peaks in 1989 and 1992 as the growth rates of those two years reached 41.6 per cent and 42.4 per cent, respectively. This is in contrast with the average growth rate of the FDI during 1981–85, which was less than 10 per cent. Of course, the FDI normally flows more in proportion into industrial and service sectors. For example, the average growth rate of the FDI to Thailand in agriculture during 1987–89 was 23.9 per cent, that of mining and manufacturing was 11.9 per cent, which is significantly less than that of the agricultural sector. The chemical sector did not perform as well either with an average growth rate of 16 per cent during the said period. However, the average growth rate of FDI in the electric and

TABLE 3
FDI Average Growth Rate by Industry
(Percentages)

	1987–89	*1990–93*
1. Agricultural Products	23.9	17.4
2. Mining & Manufacturing	11.9	20.0
3. Chemical Products	16.0	26.6
4. Electric & Electronic Products	40.8	22.3
5. Services	76.0	61.9
Total	28.2	29.5

NOTE: Based on the cumulative FDI accumulated since 1960.
SOURCE: Board of Investment (BOI).

TABLE 4
GDP Share by Industrial Origin

	1980	*1986*	*1990*	*1991*	*1992*	*1995*	*2000**	*2010**
1. Agricultural Sector	20.2	18.2	13.6	13.2	12.8	10.8	11.1	9.1
2. Industrial Sector	30.1	32.3	37.8	39.1	39.7	41.4	42.2	44.8
Manufacturing	23.1	23.4	27.8	28.7	19.6	30.9	31.5	33.4
3. Service Sector	49.7	49.5	48.6	47.7	47.5	47.8	46.5	46.1

NOTE: *Projection by the Thailand Development Research Institute Foundation.
SOURCE: NESDB, National Income of Thailand, Rebated Series, 1980–1993.

electronic sector was 40.8 per cent while that of the service sector was 76 per cent. Rapid growth of FDI in the agricultural sector during this period was due to some structural adjustment in the sector, namely, more investment in agro-industries. After 1989, there was a deceleration in growth of FDI in the agricultural sector, while industrial and service sectors continue to grow well, especially the service sector.

As a result, the share of the agricultural sector in Thailand decreased significantly since 1986. The sectoral share was 20.2 per cent in 1980 and was reduced gradually to 18.2 per cent in 1986. In clear contrast was a sharp reduction in the share of the agricultural sector in 1990 to that of 13.6 per cent. If the trend continues to be so, it is anticipated that within the first decade of the next century, the share of the agricultural sector in Thailand will be reduced to less than 10 per cent, in spite of a revival of interest in the agricultural sector as a result of the current economic crisis discussed earlier.

Direction to be Pursued by Agriculture

The Thai economic structure is rapidly changing with the agricultural sector in decline. Unfortunately, it is estimated that more than 50 per cent of the Thai population or about 20.2 million of the Thai workforce (World Bank 1986, p. 232; Pongpaijit 1985, p. 11) still earn a high proportion of their income from the sector in 1996. An

appropriate question to be raised at this point is whether the Thai agricultural sector should move more towards agro-industries with increasing intensity of capital utilization and release more agricultural labour into non-agricultural sectors or should it maintain a relatively labour-intensive, traditional small-scale farming and still keep the highest proportion of employment within the sector. Unfortunately, the answer to this simple question is much more complex than it would have been generally conceived.

The real issues rest very much on the way of life or traditional lifestyle of the Thai people, a natural advantage from a country's geographic location that must take into consideration optimal utilization of the most vital resource of the country after human resources, that is forest resource; and finally, the direction of national development that must take into account external pressure resulting from the increasing rate of globalization *in the form of increasing competition.*

The actual implication of this latter part is that Thailand must try to make rapid advancement in the area where the country potentially has a natural advantage in order to survive fierce competition resulting from an increasing degree of globalization. This means that in the area of agriculture, Thailand must be able to capitalize on the rapid development of agro-industrial technology so that its agricultural products remain competitive in international markets. At the same time, the country must also keep abreast with the majority of the traditional small farmers whose life-style can never be altered overnight. More important is the fact that ecological balance as well as long-term sustenance must also be ensured. Taking all these factors into consideration, a good balance between agro-industry and eco-farming must be well thought out.

The seemingly conflicting nature of agro-industry and eco-farming can be truly complementary by seeking a balance between the two. On one hand, agro-industry can yield desirable results by enhancing competitiveness internationally. On the other, it can produce undesirable consequences by not generating much employment and can result in rapid depletion of environmental and vital resource bases, namely forest, soil and water quality. This is due to the fact that agro-industry is usually concerned with optimal outcomes of its final products with inadequate attention given to social overhead costs, in term of resources utilization as well as pollution generated by the nature of the production process.

As already discussed, small-scale monoculture practised by most small farmers in Thailand has already proven to be not economically viable in the long run due to rapid increases in all external input costs as well as their own resource costs. While small farmers still enjoy their farming lifestyle and self-sufficient farming has proven to be an outdated mode of production in a contemporary setting with limited supply of land resources that are not very fertile, eco-farming appears to offer a viable option. Nevertheless, it is necessary to prove that eco-farming actually offers a viable *alternative for small farmers. Also the demarcation* between the two conflicting form of agricultural practices, agro-industry and eco-farming, must be clearly set so that complementarity between the two can be achieved.

Eco-farming as a Viable Option

Little academic research on the economic advantage of eco-farming over monoculture of the same scale has been done in Thailand. In fact, the above statement is also true for almost everywhere. The main reason is simply because not many conventional economists understand well the technological aspects of most forms of eco-farming. Among the small sub-set of those who understand the technology very well, they encounter a problem of calculating ecological cost or social cost of monoculture. On the other hand, they also encounter the problem of calculating the benefits from eco-farming, including its social benefit. This has made an economic comparison of the two farming practices exceedingly difficult. However, an attempt was made in Thailand by Ko Watanabe in 1994 in his Masters Thesis on "Cost-Benefit Analysis of the Integrated Farming: A Case Study of Northeastern Thailand". In his

study, he discovered the following (Watanabe 1994, p. 1):

1. Integrated farming is both economically and financially viable except for the case with high discount rate.
2. Integrated farming is more profitable than the mono-cropping system when the discount rate is low.
3. Integrated farming is less sensitive to price changes of the main crop.
4. Integrated farming requires relatively high investment in the early years.
5. Integrated farming requires more labour input than mono-cropping.

The last finding is rather appealing for employment generation. In his concluding remarks, Watanabe summarizes that integrated farming is more suitable for a farmer if the discount rate is low, especially for small farmers with surplus family labour.

It is now generally known in Thailand as well as elsewhere that monoculture is not a viable option for small farmers. Unfortunately, a viable alternative has not been without great difficulty for most of them. In a separate study done by the author, a sampling survey of 62 families was undertaken from those settling around 30 community forests across Thailand from 14 May 1994 to 12 June 1994. Based on the results of this study, it was found that 23.2 per cent of members of the communities already practised some form of eco-farming. Thirty families or about 48.8 per cent of eco-farmers operated on the average area of only 2.6 acres with an average family size of 2.9 individuals. This is in contrast with 49.1 per cent of monoculture that required the minimum average of 6.8 acres per family.

Most of the eco-farmers used to practice monoculture before and faced the problem of uncertain prices for their products. Also, the work involved was much harder because a fresh start had to be made every new cultivable season. With eco-farming, the daily cost of living could be significantly reduced because a variety of plants could be used for family needs. There was a good flow of cash income all year round due to the variety of products available for markets. The danger from using chemical products under the former monoculture system had been greatly reduced.

The benefits of eco-farming are reflected in the findings that 80.7 per cent of those who currently practised monoculture reported that they wished to switch to eco-farming. Unfortunately, the major obstacle facing them was reportedly the lack of capital. In fact, the real problem is not so much capital as the commitment necessary for the change and the technical requirements for the transformation process. The transition to eco-farming requires systematic external assistance. From the scattered evidence available, it can be concluded that eco-farming can actually offer a viable option to small farmers who are currently practising monoculture. The most difficult part is the transitional process.

New Export Opportunities for Tropical Agricultural Products

Although exports of tropical fruits and vegetables from Thailand fluctuated around 0.2–0.3 per cent of total export during 1988 to 1992, their future prospects have been rather promising. The rate of increase in the value of exports during 1991 to 1995 indicated increasing trends from that of 12 per cent in 1993 to 26.8 per cent and 21.1 per cent in 1994 and 1995 respectively. Its share of export reached 0.4 per cent in 1995. These export items include fresh and frozen fruits, fresh and frozen vegetables, canned pineapples, other canned fruits, pineapple juice, preserved fruits by sugar, canned baby corn, canned bamboo shoots, other canned and preserved vegetables and preserved vegetables by vinegar (Division of Trade Data, Department of Export Promotion 1996). In terms of market share of total exports of fruit and vegetables from Thailand in 1994, North America was the most important market with its share of 30 per cent, and Europe with 33 per cent share. The rest of the 37 per cent were of other Asian and Middle Eastern markets. It is interesting to observe that in 1994, the market in developed

economies had the share of 69 per cent. Major export items under the category of fruits and vegetables in 1994 were canned pineapple, pineapple juice, canned baby corn. They comprised 61 per cent of total export in that year. Produce such as pineapple and baby corn are products of agro-industry. The rest of the 39 per cent can be considered as produce from other traditional forms of farming practices that can be transformed into eco-farming. Such a figure can be used as one among many indicators for appropriate division between agro-industry and eco-farming in the future.

The potential of tropical fruit export from Thailand was detected much earlier. It was observed in 1982 that the export of tropical fruits from Thailand was 62,618 tons with their value of 656.5 million baht. In 1986, the quantity export rose to 71,016 tons with their values of 933.1 million baht (Smithisawasdi 1987, p. 1). The exported fruits consisted mainly of longan, durian, mango, and pomelo. Important markets have been traditionally close to Thailand, namely Hong Kong, Singapore, and Malaysia. However, markets further away, such as Europe, the United States and Japan, have kept expanding as well. The Thai Government began to recognize the significance of these fruits for the first time by incorporating a promotional plan for them in the Sixth National Economic and Social Development Plan (1987–91). They were initiated as part of the restructuring plan of the agricultural sector by replacing some farm areas used for rice, cassava and coffee.

It should be noted in addition that current technology in tropical fruit produced in Thailand is one of the most advanced in the world. Better still, most technology for the improvement of the produce were discovered and invented by the orchard growers themselves. In the past, fruit produce was rather bulky for transportation and easily perishable. Consequently, the markets were limited only to the vicinity of growers. The situation now has changed radically. Networks of

TABLE 5
Value of Export of Vegetables, Fruits and Herbs
(Million baht)

Produce	*Value of Export*						*Average Annual Growth Rate*
	1990	*1991*	*1992*	*1993*	*1994*	*1995*	*(1990–95)*
Frozen Fruit	1,159.4	1,081.7	1,570.9	1,762.3	2,444.1	3,149.7	23.7
Frozen Vegetable	774.7	1,083.6	1,520.1	1,702.7	1,950.5	2,173.9	23.6
Canned Fruit	9,698.8	13,308.9	13,994.8	13,131.8	12,840.1	13,128.6	7.2
Canned Vegetable	2,650.1	4,026.7	3,459.8	3,360.5	3,877.8	4,664.4	14.1
Spice and Herb	693.4	652.2	934.7	679.0	512.4	509.2	3.0
Herbal Produce	222.4	198.9	242.6	245.8	239.1	244.8	2.5
Dried Vegetable	67.7	90.5	86.6	81.5	124.5	129.4	16.0
Betel Nut	189.1	116.0	155.5	168.5	196.2	262.9	10.8

SOURCES: Calculated from the data of the Department of Economic Commerce, Ministry of Commerce.

TABLE 6
Value of Export of Some Selected Agricultural Produce
(Million baht)

Produce	*Value of Export*						*Average Annual Growth Rate*
	1990	*1991*	*1992*	*1993*	*1994*	*1995*	*(1990–95)*
Rice	27,769	30,516	36,214	32,959	39,187	48,626	12.5
Maize	4,130	3,892	510	680	544	468	–18.7
Rubber	23,557	24,954	28,925	29,183	41,824	61,261	22.5
Cassava	24,465	24,884	29,613	21,735	18,773	18,254	–4.5
Sugar-cane	17,694	14,781	18,920	12,185	17,203	28,769	16.9

SOURCE: Department of Economic Commerce, Ministry of Commerce.

TABLE 7
Value of Export of Spices and Herbs
(Million baht)

Produce	*1991*	*1992*	*1993*	*1994*	*1995*
Pepper	108.3	139.5	134.0	70.0	57.5
Tamarind	125.8	150.6	131.5	156.1	114.9
Spice	217.5	412.5	232.7	173.5	226.3
Herb	200.6	232.1	180.9	112.7	110.5
Total	652.2	934.7	679.1	512.3	509.2

SOURCE: Department of Economic Commerce, Ministry of Commerce.

better roads are connecting almost all corners of Thailand, and there is no specific place in Thailand that is too far for fruit transportation. Air fares for quick overseas fruit transportation has come down considerably. As already discussed, more markets overseas are now available, especially those in developed countries that have come to appreciate more of the exotic taste of tropical fruits. At the same time more canned fruit industries are currently available in Thailand. As a result, orchard growers in Thailand enjoy reasonably good prices for their produce.

Unlike annual cropping of monoculture, most fruit trees are of perennial nature. No intensified work is required during a specific time of the year once the tree is planted. Orchard growers in general have more free time than rice farmers and upland cash-croppers who must start afresh with

their crop every year with a period of intensified work. With the prices of their produce higher than that of average agricultural products, orchard growers also experience less economic pressure than their counterparts in other agricultural professions.

Given the fact that the living environment in an orchard setting is more conducive to research and development than a rice field or an upland farm, not surprisingly orchard growers have better opportunity to pursue their own "research" continually. At the same time, the incentive scheme also works in their favour. All their "research" that result in better "quality" of their produce will reap them more economic rewards almost immediately. This form of economic benefit has enhanced their research initiative considerably. As a result, most orchard growers in Thailand have ongoing "research", and provide Thailand with strong competitive edge in tropical fruits export. Because of this so-called "built-in" learning process among orchard growers in Thailand, their knowledge base should be higher than the average of those who earn their living from agriculture. This last favourable aspect is also consistent with the attempt at human resource development clearly stated in the Eighth National Economic and Social Development Plan (1997–2001).

Spices are items of increasing significance in agricultural produce for Thailand and considered the unique natural advantage of the tropical location of the country. Apart from generating ap-petite, spices can contribute to the stimulation of the digestive system as well as destroy germs and bacteria produced from a fermentation process. This last property of spices is also very useful for food preservation.

Only a few variety of spices are being exported from Thailand. Among them are pepper, dried chilli, cardamom, and dried ginger (The Thai Farmer Bank 1987, p. 2). However, in the world market is a wider range of herbs that are currently in demand. Among them are cinnamon, cloves, turmeric, and nutmeg. The limited export list of spices from Thailand is due to the fact that a major part of arable land in Thailand is occupied by rice fields and upland crops. To become an exporter of spices, Thailand must undergo a major switch from monoculture to eco-farming. This is because eco-farming is more conducive to cultivation of spices.

Herbs are another group of plants that Thailand has good potential to supply in large quantity but did not have much to export in the past. Two reasons explain this situation. The first one is due to the introduction of western medicine to Thailand in 1887, which resulted in the abandonment of traditional training of Thai medicine from 1904. The Act of Medical Treatment of 1932 and the Medicine Act of 1967 did not allow the utilization of herbal medicine by those who practise western medicine, nor could western sciences be adopted to develop Thai traditional medicine. These two Acts closed the opportunity for further development of medicine based on existing herbs in Thailand (The Thai Farmer Bank 1989, pp. 1–2). A major part of arable land in Thailand has been occupied by rice fields and upland crops. Although in the late 1990s exports of herbal medicine from Thailand ranged from 400–500 million baht, they were collected mostly from natural forests rather than being grown for commercial purpose. A significant increase in the supply of herbs must also be part of a major switch from monoculture to eco-farming.

Not of least importance, traditional vegetables in Thailand consist of young leaves, flowers, fruits and roots of plants naturally grown. The major switch to consumption of the conventional vegetables known in Thailand as "Chinese" vegetables because they were introduced to Thailand by the Chinese, had taken place within a century. The so-called "Chinese" vegetables originated from a temperate zone where they can grow well without much disturbance from various kinds of insects. In tropical zones where various kinds of insects can multiply rapidly under certain conditions almost all year round, commercial cultivation of "Chinese" vegetables under normal conditions will encounter more severe insect problems than their original environment. Insecticide must be applied in great quantity to the point that it can be harmful to both growers and

consumers of the vegetables. Also, vegetables that grow well in a temperate zone must endure the heat in a tropical country. Conventional practice for the remedy is to apply more water on a daily basis as well as more chemical fertilizer. As a result, the consumption of "Chinese" vegetables is rather costly as well as a health hazard.

Currently, there are various forms of campaigns calling for the revival of the practice of consuming traditional vegetables. Apart from being less costly and less of a health hazard, a variety of vegetables also provide nutrient balance as well as some medicinal value as most of them are also herbs (Jonjobson 1994, p. 11). Such campaigns will also be consistent with the switch to eco-farming.

Eco-farming as a Crucial Link

All that was already discussed in the last section will not come to fruition without a major switch from the conventional practice of monoculture to eco-farming. To summarize, most forms of eco-farming, growing fruit trees and a variety of spices and herbs in the most possible complementary way is the core of this form of farming practice. If Thailand is going to be successful in exporting more of tropical fruits, spices and herbs, the switch from conventional monoculture that grows only rice, corn, cassava, sugar-cane, cotton, kenaf, and natural rubber, to eco-farming is a must.

Evidence indicates rather clearly that eco-farming provides more employment opportunities for much smaller plots of arable land. It also provides a built-in system of continual learning, a great way for continued improvement in quality of human resources. The most difficult question is how to make the switch, and where should the eco-farming be practised. The question of how to switch to eco-farming warrants another independent study. However, the question of which area should the eco-farming being concentrated will be discussed fully below as part of the answer to the right mix between eco-farming and agro-industry.

How to Strike a Balance

Eco-farming must be practised as part of the overall resource conservation scheme, especially forest resources. A few facts should be introduced before further discussion. Thailand's total amount of national reserved forests, declared by the Thai Government in 1992, is 58.8 million acres. The actual forested areas in 1993, was 33.4 million acres. In order to protect the area from further reduction, the government declared 35.2 million acres to be conserved forests in 1992. The difference between the figure of national reserved forests and that of the conserved forests of 23.6 million acres is that the national reserved forests are outside the conserved areas. Virtually the remaining areas of 23.6 million acres must be without trees since the amount of forests with trees in 1993 was already smaller than that of the conserved forests in 1992.

The remaining area of national reserved forests without trees of 23.6 million acres should be targeted for eco-farming for protection of the conserved forests and the regeneration of green areas. Because of this curious nature of forests without trees, since 1993 the Royal Forest Department has transferred the supervision of around 17.6 million acres to the Office of Land Reform for Agriculture to issue land reform titles to the majority of small farmers who had already encroached into those areas for cultivation before 4 May 1993. The maximum area allowed for each individual farmer is 20 acres. Presently, less than 30 per cent of the allocated land has been issued land reform titles to small farmers with average holdings of less than 8 acres for each farmer. Therefore, the portion of national reserved forests to be used for "land reform" purpose is currently under cultivation by small farmers. Because of this fact, there is a strong justification to transform monoculture, still practised by the majority of small farmers under the land reform scheme of 17.6 million acres and the remaining ones of 6 million acres currently under the supervision of the Royal Forest Department, into eco-farming.

If that goal is achieved, there is a much better chance for the remaining conserved forests to be

preserved. This is because eco-farming relies greatly on natural fertility. The fertility of the forest area will be ideal for eco-forming. Eco-farmers will have strong incentive to protect the forests for their own long-term benefits. With additional land of at least 15 million acres (presumably people in some areas of 5 million acres already practised eco-farming) being transformed from monoculture into eco-farming, the deficiency in increasing supply of tropical fruits, herbs and herbal medicine discussed earlier will be removed.

Of course, areas outside the so-called "national reserved forest" of 58.8 million acres that are still available for agricultural purpose can be used for agro-industry, so long as there is no conflict of interest between the two forms of agricultural practice. In the event of environmental conflict between the two within the defined areas allocated for eco-farming, the latter must have priority. Outside those areas, agro-industry can have priority pending on societal approval.

By such clear demarcation between the two forms of agriculture may seemingly conflicting objectives be achieved at the same time. While the level of international competitiveness can be maintained by the application of agro-industry in the area outside the so-called "eco-zone" (eco-farming plus conserved forests), the objective of forest resource and environment protection can also be achieved simultaneously. Employment generation and the way of life of more than 20 million farmers can also be preserved. Such will not be possible under the scenario of full application of agro-industry. Additional gain from such division and the most important one is the continued improvement in the quality of human resources, the most valuable resource for the country.

Conclusion

This study demonstrated the clear trend of agricultural development in Thailand up to the present (1996). It appears that agriculture in Thailand is currently at the cross-road. Strong external pressure resulting from increasing competition due to increasing degree of globalization will push the agricultural sector in Thailand more into the direction of agro-industry.

Although agro-industry will equip Thailand with better competitive edge, it will also result in more wasteful utilization of vital natural resources, namely, forest, soil and water quality. At the same time it will not generate much employment. There will be a big question of how to transfer approximately 20 million people currently employed in agricultural sector into other sectors without shattering their preferential way of life.

Eco-farming seems to offer solutions to the two most difficult questions, since eco-farming is both employment generating and environment protecting. The practice of eco-farming will also develop the potential to increase exports of tropical fruits, spices and herbs for Thailand which is its natural comparative advantage. Eco-farming also offers a built-in system for continual improvement of the country's most vital resource, that is human resources.

To strike a balance by maintaining a competitive edge gained from the practice of agro-industry and the practice of eco-farming by most small farmers, a clear line between the two must be drawn. In the case of Thailand where the total area of 58.8 million acres is still being kept as "national reserved forests", the "eco-zone" should be regenerated within this area. While the area of 35.2 million acres must be kept as "conserved forests", the remaining 23.6 million acres should be transformed into eco-farms. Of this amount about one-fourth of it is still under the supervision of the Royal Forest Department and other three-fourths is under the supervision of the Office of Land Reform for Agriculture. The two areas should be formed into a complete "eco-zone".

The area outside of the "eco-zone" which is now available for agriculture can be used for agro-industry. In the event of environmental conflict between the two farming practices, within the "eco-zone" the eco-farming should have the priority. Outside the "eco-zone", the agro-industry should have the priority pending societal

approval. This way, the balance between the two seemingly conflicting practices will be achieved and various seemingly conflicting objectives can also be achieved simultaneously.

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