

INCREASING THE SCALE OF SMALL-FARM OPERATIONS I. THAILAND

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ABSTRACT

As a result of the rapid economic changes in Thailand, small-scale farmers find themselves in a difficult situation. Strict forest conservation has restricted the supply of potential farmland, while land prices are rising as a result of non-agricultural demand. This suggests that it is no longer possible to enlarge the scale of production by expanding the farm size: instead, farm management scale must be increased. There is already evidence to suggest that this solution is practicable and successful.

INTRODUCTION

As the world turns towards the year 2000, almost all developing countries are facing many economic changes which are in fact the results of their own economic development policies. Deteriorating natural resources and growing environmental problems are the major issues of this decade, while trade deficits, poverty, and income inequality remain critical problems. On the other hand, export promotion, industrial and service investment, and advancement of technology have come to dominate agricultural production, and the traditional labor-intensive system that has long been practiced in these countries. The importance of the agricultural sector, in terms of contribution to the national income, is no longer greater than that of the industrial and service sectors. Development policies have tended to favor the non-agricultural sectors.

The agricultural sector itself is in something of a dilemma when dealing with the issue of scale of production. As a result of export-oriented development policies, large-scale production has been promoted with various incentives, while small-scale production has been left behind. Independent small-scale farmers, once the majority of the population in many developing countries, are struggling to survive in a changing economic situation. Policy issues and

research relevant to small-scale farmers are often given low priority.

Thailand falls into this pattern. The country has been successful in terms of export promotion and economic growth during the past decade. In spite of some decline, the agricultural sector, is still significant, but there are many problems. Small-scale farmers are trying to run their farms in a different environmental, and economic context than before, and are producing for a different market. The main issue now is how such smallholders can survive and maintain their livelihood in the future, as Thailand becomes increasingly industrialized.

The following section of this Bulletin deals with the present situation of small-scale farmers in Thailand. It discusses the changing structure of the Thai economy, its effect on the agricultural sector, and various policies intended to enlarge the scale of farm operations of smallholders.

CHANGING STRUCTURE OF THE THAI ECONOMY

The economic structure of a country usually reflects at least two things: the natural resources it is endowed with, and the economic policy of that country. The Thai economy has developed on the basis of abundant natural resources, particularly

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agricultural ones. Crops, especially rice, and forest products were the predominant export items from 1950 to 1970. The industrial sector made only simple products and was considered of minor economic importance.

This pattern of production and trade changed significantly in the 1970s, when an export promotion strategy was adopted, replacing the former import substitution strategy. New economic crops, in particular maize and cassava, were developed to meet the growing demand abroad, taking advantage of abundant fertile land and low labor costs. Improving the rural infrastructure, particularly the road network, promoted the expansion of export crop production in new areas. As the amount of agricultural land increased, forest land and the export of forest products gradually decreased. At the same time many manufactured products, particularly textiles, were developed, as a result of successful investment incentives and foreign joint-venture policies.

During the 1980s, the agricultural sector had to cope with two major problems: the declining prices of export crops, and stagnating farm productivity. New agricultural land became scarce and marginal, while the area of forest declined to the minimum reservation target. The contribution of agriculture to the national economy diminished. Moreover, there was environmental deterioration, through the lack of proper management and control of resources. Deforestation, water shortage, and the inefficient use of fertilizers and chemicals, were among the most critical issues. Meanwhile, investment into the industrial and service sectors continued to increase, given the favorable investment climate. Factories for many non-traditional manufactured products, such as processed foods and electronic goods, were established and did well. Although the total value of agricultural commodities increased over time, the sharp rise in the value of industrial products and tourism showed that Thailand could now be considered a newly industrialized country rather than an agricultural one.

Trends in the Thai economy during the 1990s will depend mainly on the direction of the country's economic policies. Given the rapid growth in the non-agricultural sector, now an important source of export earnings, and the stagnation of the agricultural sector which produces the staple foods and employs most of the population, it seems that Thailand may have to learn to compromise in selecting its development and growth targets. In other words, Thailand now needs to consider the quality as well as the quantity of its economy.

These changes in Thailand's economic struc-

ture are clearly reflected in the GDP (Gross Domestic Product). The proportion of GDP earned by the agricultural sector was 51% in 1950, but had fallen to 11% in 1990. During the past 15 years, the contribution to the total GDP from the industrial and service sectors rose from 24 and 46%, respectively, in 1975, to 37 and 49% in 1990.

PRESENT PROFILE OF THE AGRICULTURAL SECTOR

Agricultural Resources

Agriculture still serves as the main source of employment in Thailand, supporting 63.64% of the total population. The agricultural labor force is expected to decline over time, due mainly to the limited area of farmland and the rapid expansion of the non-agricultural sectors which will absorb agricultural labor. The Applied Economics Research Center (1989) predicted that by the year 2000 only 50% of the labor force will be employed in agriculture. In other words, the agricultural sector will no longer be the major source of employment in Thailand after the end of this decade.

As mentioned above, any increase in agricultural land tends to mean a decrease in the area of forest land. Clearing forest has traditionally been the way of expanding farmland area in Thailand. In 1975, farmland accounted for 17.9 million ha and forest 20.92 million ha. By 1988, farmland covered approximately 21.25 million ha and forest only 12.85 million.

If this pattern continues, the area of forest by the year 2000 will be far below the minimum reservation target of 10%.

Scale of Agricultural Production

Though the average farm area per person in Thailand has long been constant at around 0.61 ha, farm size varies significantly in different regions. Table 1 shows the changes in farm size between 1975 and 1988.

Out of 5,244,643 farms from four regions in 1988, the average farm size was 4.51 ha. Farm size in the Central region (5.45 ha) was larger than in the other regions — the Northeastern with 4.51 ha, the Southern with 4.24 ha and the Northern with 3.97 ha. There was a slight increase in the average farm size in each region from 1981 to 1988, but the majority of Thai farmers are still small-scale. The Office of Agricultural Economics (1991) estimates that 53.81% of farmers have a land holding of less than

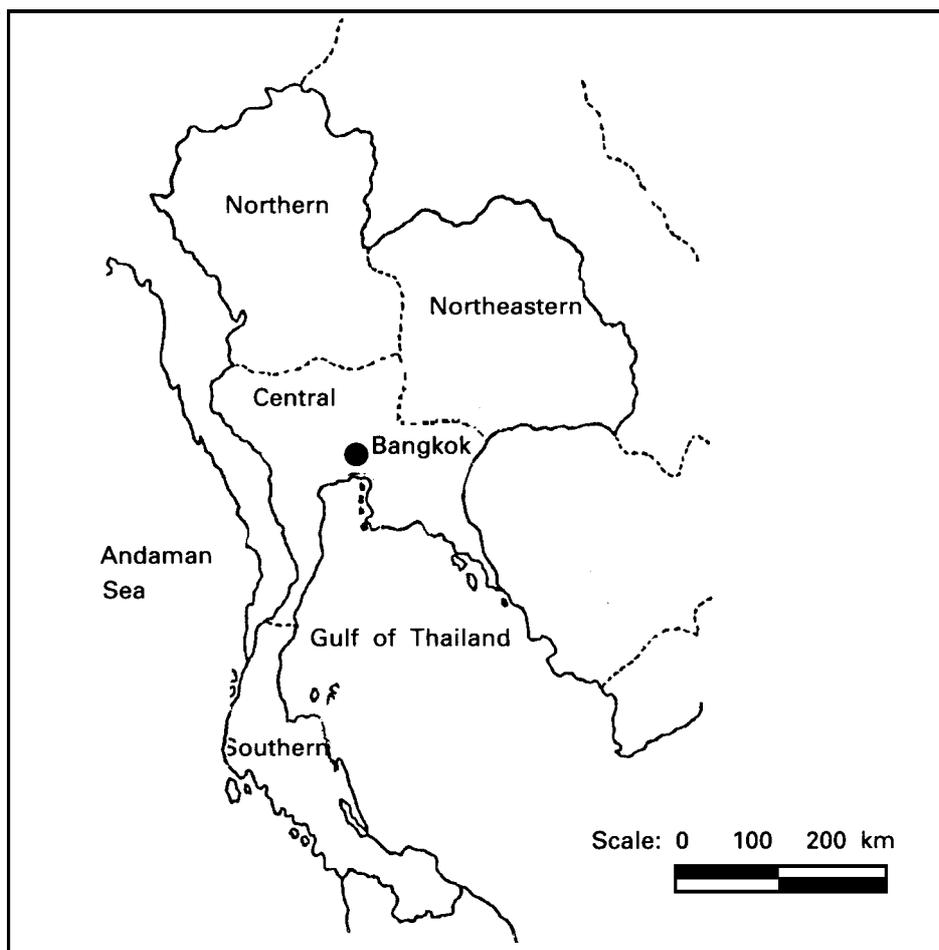


Fig. 1. The four regions of Thailand

3.2 ha. Furthermore, 30.86% of farmers (mostly small-scale ones) do not own the land they farm.

FARM OPERATIONS OF SMALLHOLDERS

Agricultural Production by Smallholders

Farm size within the different regions also varies according to land fertility and the type of crop grown. Less fertile land requires a larger farm size in order to maintain a minimum income level. More fertile land can earn a sufficient income for the farmer even if the farm is small.

Table 2 shows the size of farms producing four major crops—rice, maize, cassava and soybean—in the four different regions. Land fertility has some effect—maize and cassava grown on the least fertile land, the eastern provinces of the Central and Northeastern regions, are usually produced on

fairly large farms. The small size of farms in the Northern and Southern regions is offset by their greater fertility, and the fact that farms in the Northern region can produce up to three crops a year. Rainfall in the Southern provinces has a favorable distribution which allows the production of high-value tree crops such as fruit, rubber and oilpalm. However, in general it is clear that most farms producing these crops are rather small, less than 3.2 ha. Only maize grown in the Central region is grown on farms with an average size of 4.03 ha. Without modern technology, this small farm size also indicates the low income level of Thai farmers.

Farm size is a factor which the farmer generally cannot control. Smallholders cannot choose the size of their farms to give the most efficient type of production and best use of resources. They have to do whatever they can to sustain farming on whatever land they have. This will lead to ineffi-

Table 1. Changes in area of farm land and average farm size in Thailand by region, 1975-1988

Region, Year	No. of farms	Average farm size (ha)
Northeastern		
1975	1,675,650	4.54
1981	1,840,184	4.50
1988	2,158,780	4.51
Northern		
1975	1,054,521	3.63
1981	1,181,594	3.61
198	1,371,921	3.97
Central Plain		
1975	826,505	5.33
1981	887,930	5.17
1988	997,492	5.45
Southern		
1975	563,370	3.76
1981	622,643	3.66
1988	716,450	4.24
All Thailand		
1975	4,120,046	4.36
1981	4,532,351	4.28
1988	5,244,643	4.51

Source: Office of Agricultural Economics, Thailand

Table 2. Average farm size of selected economic crops in Thailand by region, 1987/88

Crop	Region					Whole Kingdom
	Northeastern	Northern	Central	Southern		
Rice	2.20	2.01	2.99	1.53		2.22
Maize	2.83	2.35	4.03	1.31		2.79
Cassava	1.85	2.04	3.42	0.00		2.20
Soybean	1.66	1.59	2.68	0.00		1.68

Source: Office of Agricultural Economics, Thailand

ciency in farm production unless there is proper farm management.

Effect of Farm Size on Production Efficiency

Production efficiency can be determined in terms of productivity and cost of production. Higher productivity and lower production costs indicate

higher efficiency in farm production. Net farm income (total farm income, representing farm productivity, minus total farm expenses representing cost of production) may also be used as an overall indicator of production efficiency.

Table 3 confirms rather strongly the direct relationship between farm size and farm efficiency, in that smaller farm size gives a lower net farm income. Net annual farm income in Thailand ranges from US\$

161 on the smallest farms (2 rai, less than 0.32 ha) to US\$ 605 on the largest (70 rai, more than 11.20 ha). However, if non-farm income and farm household expenses are included, farm size does not affect net income nearly as significantly.

In the case of smallholders in a developing country such as Thailand, lower productivity is partly due to insufficient use of inputs such as fertilizers and pesticides, because of a lack of capital and credit. Furthermore, it is difficult for small-scale farmers to mechanize their operations and thus reduce the unit cost of production. Smallholders must operate their farms at a relatively high unit cost and with lower productivity.

It is generally accepted that chemical inputs used in Thai farming are not well distributed. While smallholders cannot obtain enough fertilizer, the commercial large-scale producers use abundant fertilizer and chemical pesticides, to the extent that they cause serious environmental damage. The concept of agricultural sustainability in the case of smallholders, therefore, suggests the application of more farm inputs such as fertilizers and chemical pesticides, in order to increase and then sustain farm productivity. Such a concept of sustainability for smallholders in developing countries is somewhat different from that being employed in developed countries, where farm inputs are already excessive and need to be reduced.

Constraints to Small Farm Operations

Enlarging the operations of small-scale farmers can be carried out in two ways: expanding the size of land holdings, and expanding the scale of farm management. Since forest clearance is now coming to an end, expanding farm size can be done only through land reform, land resettlement and land consolidation programs. To expand the scale of farm management requires both government programs and the farmers' own farming skills, in order to introduce improvements such as multiple cropping and integrated crop-livestock farming. Agricultural infrastructure must be improved as a prerequisite for better farm management. For instance, an improved irrigation network is necessary for a multiple cropping system. At present, only 20% of the rice planting area, mostly in the Central Plain, is irrigated while the remaining 80% is rainfed and can only produce one crop a year. Agricultural credit also needs to be promoted. These improvements thus require a high investment cost, but promise good returns.

Since 1988, the land market in Thailand has

been changing rapidly due to the increasing demand for land for tourist resorts, golf courses etc. Land prices have risen, and this has inevitably affected the use of agricultural land and made it difficult for farmers to increase the size of their farms. Expanding the farm management scale through improved farming systems seems to be the only way in which Thai farmers can enlarge their scale of production.

GOVERNMENT POLICIES TO ENLARGE THE SCALE OF PRODUCTION

Substantial agricultural development in Thailand started with the first five-year National Economic and Social Development Plan in 1961. The general objective of the Thai government during the early years was to improve the standard of living of farmers. The emphasis was therefore on developing the infrastructure, particularly irrigation and the transportation network.

Expansion of the transportation network resulted in an increase in the area of newly cultivated land where the new roads reached, and the clearing of forest. In newly irrigated areas, the government began the land reform and land consolidation programs to promote more efficient use of the irrigation system. In 1968, the Bank of Agriculture and Agricultural Cooperatives was established, mainly to provide loans to Thai farmers. At the same time, the Department of Agricultural Extension was set up to help transfer new production technology to farmers in both irrigated and rainfed areas. This new technology included the use of improved varieties, farm mechanization, application of fertilizers and other chemicals, and proper cultivation techniques. Such programs were implemented intensively in the 1970s, when export crop production was rapidly promoted.

With declining crop prices and stagnant productivity in 1980s, crop diversification to reduce risk and increase farm incomes was recommended for rainfed areas. For the same reason, multiple cropping and integrated farming systems were promoted in irrigated areas. A popular integrated farming system is fish culture and poultry raising, combined with field and tree crops.

During the past four years, many cooperative programs combining the private and public sectors have been established. Most of these aim at reducing risk and uncertainty in farming, as well as improving pricing and marketing systems for farm products.

One example is the "Agribusiness Integration Project", in which private firms supply neces-

Table 3. Average farm income and expense in Thailand by farm size, 1986/87

Unit: US\$/farm

Item	Farm size (ha)									Average
	<0.32	0.32-1.60	1.60-3.20	3.20-4.80	4.80-6.40	6.40-8.00	8.00-9.60	9.60-11.20	>11.20	
Cash farm income	522.35	605.88	656.47	702.35	812.16	837.25	887.45	1011.37	995.29	712.55
Non-farm cash income	540.00	486.67	544.71	535.69	459.61	511.76	542.75	581.57	618.04	521.57
Total income	1062.35	1092.16	1201.18	1238.43	1271.76	1349.02	1430.59	1592.94	1613.33	1233.73
Cash farm expense	361.18	304.71	328.24	342.75	356.86	520.00	497.65	438.04	390.20	359.22
Farm household cash expenses	737.65	703.14	743.92	758.82	754.90	774.90	885.10	780.78	717.25	746.67
Total expenses	1098.82	1007.84	1072.16	1101.57	1111.37	1294.90	1382.75	1218.82	1107.45	1105.88
Net farm income	161.18	301.18	328.24	359.61	455.69	317.65	389.80	573.33	605.10	353.33
Net income	-36.47	84.31	129.02	136.08	160.39	54.12	47.84	373.73	505.88	127.84

sary farm inputs to farmers who buy them on credit from the Bank of Agriculture and Agricultural Cooperatives. At the same time, the Department of Agricultural Extension provides participating farmers with technical information. The private firms buy back the farm products at a guaranteed price. Crops grown under this project include maize, sorghum, soybean, and sunflower.

In addition, project, there are a number of examples of contract farming, whereby farmers produce e.g. vegetables or vegetable seed for commercial firms under contract. Farmers can enjoy a secure market for their products, while the private firms are assured of sufficient raw materials for their processing plants.

Tables 4, and 5, showing summarized results of various case studies, clearly demonstrate that the net farm incomes from farmers participating in the agribusiness integration project and contract farming are much higher than those of independent farmers. In the case of agribusiness, participating farmers received net profits of US\$250/ha, 11% higher than those who did not participate. In the case of contract farming, farmers producing under contract earned US\$1,878/ha, more than ten times more than independent farmer, who earned only US\$171/ha.

CONCLUSION

The growth in the Thai economy over the past decade has changed the economic structure in favor of the non-agricultural sector. This has had a significant impact on agriculture, particularly with regard to higher land prices. These, combined with population pressure, limited arable land, and strict

conservation of forests, makes it almost impossible for smallholders to expand the size of their farms. Land degradation and erosion from farming, especially on marginal land, has made the situation even worse.

However, enlarging the scale of farm operations of smallholders in Thailand is still possible, if it is accomplished by improved farm management. Cooperation between the private and public sectors, and especially between related government agencies, is greatly needed. The higher incomes from agribusiness and contract farming clearly show that there is a potential solution for the smallholders of Thailand, at least in this decade.

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Table 4. Cost and returns of corn production by farmers who did and did not participate in an agribusiness integration project

Item	Participating farmers	Non-participating farmers	Difference
Number of samples	3.73	3.84	
Yield (Kg/ha)	166	131.76	34.24
Gross revenue	431.61	342.59	89.02
Variable costs	145.69	128.04	17.65
Fixed costs	35.02	36.55	-1.37
Total costs	180.71	164.59	16.12
Net profits	250.90	177.84	73.06
Rate of return (%)	5.45	4.24	1.22

Source: Wattanutchariya, 1991

Table 5. Costs and returns for Agro-industrial crops under contract farming and dry season rice in the Mae Oon Irrigation Project, 1990/91 Crop Year

Unit: US\$/ha

Item	Agro-industrial crop (contract farming)	Dry season rice (non-contract)	Difference
Revenue	1,857.84	436.04	2,480.63
Costs	1,038.24	264.94	773.29
Net returns	1,878.43	171.10	1,707.33

Notes: Agro-Industrial crops include

- a) Vegetable seeds such as tomato, watermelon, cantalope etc.
- b) Processing crops such as tomato, baby corn, tobacco etc.
- c) Vegetables such as asparagus, seedless watermelon

Source: Royal Irrigation Department, 1991

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DISCUSSION

Q. (Agus Pakpahan)

Why is it so difficult to stop deforestation in Thailand?

A. We have good effective policies, but it is difficult to enforce them. Deforestation usually takes place in order to clear land for agriculture, sometimes for export crops but often for subsistence. Social forestry may be a good solution, but this has not yet been thoroughly demonstrated.

Q. (Young-Duck Kim)

You mentioned that Thailand has cooperative programs which link the private sector and contract farmers. What level of government support is given to private firms and to farmers?

A. The government provides technical assistance only to farmers. Private firms taking part in the Agribusiness Integration Project can enjoy tax exemption for several years.

Q. (Young-Duck Kim)

What possibility is there for agricultural cooperatives to become directly involved in agribusiness?

A. The Thai department of Agriculture and Cooperatives has its own rice mills run by cooperatives, but these do not operate all year round. They are only for cooperative members, and are not very effective since they cannot compete with the private sector.

Q. (R. Villareal)

If it is not possible to increase farm size, because of the rapid conversion of farmland into tourist resorts and residential areas, it is best to increase farm activity. In the Agribusiness Integration Project, who initiates the integrated activity? Is it the government or the private sector?

A. In the Agribusiness Integration Project, it is usually initiated by the Department of Agricultural Extension, in cooperation with the Bank for Agriculture and Agricultural Cooperatives (BAAC), a government bank which provides insurance in case of crop failure. In contract farming, it is the private company which takes the initiative. For example, vegetable seed was formerly produced in Taiwan, but production has now moved to Thailand where it is carried out by farmers under contract. It is very profitable, although there are some health problems arising from the use of insecticides.

Q. (Tso-Kwei Peng)

Your data indicates that the forest area has declined very rapidly over the past decade, but there has also been a decline in the forest product industry. Doesn't the timber being cut get into the national account?

A. Such areas are not very productive of high-value timber, and the farmers tend to simply burn the forest down.

Comment (N. Tsuboi)

The average farm size in Thailand is 4.5 ha. This is 450% larger than the average Japanese farm, and doesn't seem small to me.

A. If farmland is irrigated, 2 ha may be enough to give a reasonable income to the farm household. If the land is rainfed, a farm needs to be more than 5 ha, especially since the returns from corn production are quite low. Most farms producing the major economic crops are less than 3 ha in size.

Comment (Mohd. Ghazali)

You say that it is not possible for Thailand to increase the actual size of farms, but if the farm population is now 60% and is expected to decrease, surely farmland will either be released or be left unutilized? Some land

will be taken up by golf courses, but this should be more than off-set by the number of farmers leaving to work in industry.

A. Farm size may increase, but this depends on the growth of the industrial/service sector, and whether it can match the high rates of the past five years. Thailand is already exporting labor, which implies that the labor supply is greater than the demand. If the government cannot control deforestation, there is a chance that farm size may increase, but the 1990s are likely to have stricter forest conservation than before.