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Economic Development of Thailand: An Analysis of the Agricultural Sector

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ECONOMIC DEVELOPMENT OF THAILAND: AN ANALYSIS OF THE AGRICULTURAL SECTOR

by

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ABSTRACT

Economic Development of Thailand: An Analysis of the Agricultural Sector

by

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This study takes a look at government aid to agriculture in Thailand and attempts to analyze its effectiveness. Only two crops have been aided directly by the government, rice and rubber, though others have undoubtedly benefitted by improvements in the country's infrastructure. The regressions performed on some simple production functions indicate that rice yields have been improved through government programs. The program for rubber largely a subsidy for new plantings, has as yet not had much impact on yields. This maybe due to the fact that the pay-off period is at least seven years. There is also some evidence that maize yields have improved through the opening of new lands by highway and rail. The rest of agriculture in Thailand still largely relies on nature and the Gods to determine output. It may well be true for a change.

(87 pages)

CHAPTER I

HISTORY AND GENERAL ECONOMY OF THAILAND

Historical Aspects

Before June 24, 1939, Thailand was known as Siam. The Portugese were the first Europeans to reach Siam in 1511. D. Insor points out:

> "Thailand" is the official name of the country and corresponds to the name used in Thai. "Siam" refers to the Kingdom rather than the country, and has been superseded except among Europeans. Kings were absolute Monarchs until 1932 and are now constitutional.[1]

Origin of the Thais

About 4500 years ago, the Thai people settled at Northwestern Szechuan in mainland China and later moved south along the Yangtse Valley--the same as pioneer people in the United States moved to the West. The official yearbook of Thailand states that:

> The Chinese called them [Thais] by the proper names of Muang, Lung and Pa, but the Thais called themselves Ailao. The Chinese gradually began to encroach upon them and press them hard. . . . they started their southward migration. The first wave of these migrations occurred at the beginning of the Christian era, and in the meantime, they came to call themselves Thai.[2]

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[1] D. Insor, Thailand: A Political, Social and Economic Analysis (New York: Frederick A. Praeger, 1963), p. 5.

[2] Ibid., p. 11.

The group eventually moved to the Indo-Chinese peninsula, which is now known as Thailand. The historical eras of Thailand are classified as:

(1) The Nanchaw Era (AD 650-1253)
(2) The Sukhothai Era (AD 1238-1350)
(3) The Ayuthaya Era (AD 1350-1767)
(4) The Bangkok Era (AD 1767-1932) and
(5) The Constitutional Era (1932-)[3]

Throughout the history of Thai people, they were confronted with "war and peace" cycles. In 1855, however, King Mongkut of Thailand launched a policy of "selected involvement" with the West while colonial powers were gobbling up Southeast Asia all around him. The policy worked remarkably well--Thailand stayed out from under the Imperialist thumb and began a new era of international trade and international development.[4]

Geography and Topography

The area of Thailand is approximately 518,000 square kilometers or about 200,000 square miles.[5] The topography may be divided into the following five physiographic provinces: the Northern Folded Mountains, the Central Plain, the Khorat Plateau, the Southeast, and the Peninsula.[6] According to

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[3] Harvey H. Smith, Donald W. Bernier, and Frederica M. Bunge, Area Handbook for Thailand (Washington, D. C.: U.S. Government Printing Office, 1968), p. 41.

[4] "Thailand," Peace Corps in East Asia and Pacific: 1969 (Washington, D.C.: U.S. Government Printing Office, 1969), p. 4.

[5] Thailand Official Yearbook 1968 (Bangkok, Thailand: Government House Printing Office, 1968), p. 2.

[6] Ibid.

tradition and culture, the whole kingdom is divided into four parts or regions with 71 administrative units called provinces or "Changwads."

Demography Aspects

Thai people living in the four regions are separated because of differences in their way of life, standards of living, and types of culture. In all four regions, the bulk of agriculture is carried out at a low level of productivity with most work being done by manual labor.

H. W. Singer states:

> Any visitor to an underdeveloped country will observe first, the bulk of the population, about 80 per cent in our sketch is employed in agriculture and, second, agriculture is carried on at a particularly low level of productivity.[7]

In 1919, the population of Thailand was 9 million; in 1935 it was 13 million; and in the census year 1960 the 1935 figure had doubled. It may readily be seen in Table 1 that the estimated population will have tripled from 1935 to 1971. The projection of the population made by the National Economic Development Board (NEDB) from 1971 to 1981 is based on a birth rate of 3.4 per cent per annum. Economic growth is essential to maintain this rapidly increasing population.

Economic Structure

Generally speaking, Thailand is monetarily poor. Almost all of its farmers are caught in a vicious circle of poverty. Three-fourths of the

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[7] H. W. Singer, International Development: Growth and Change (New York: McGraw-Hill Book Company, 1964), p. 50.

Table 1. Population of Thailand

Year	Population
1919	9,000,000
1935	13,588,000
1938	14,487,000
1947	17,422,689
1960	26,257,916
1964	29,555,198
1965	30,572,834
1966	31,482,496
1967	32,419,954
1968	33,552,238
1971	34,300,000
1976	46,600,000
1981	55,900,000

Source: Figures from 1919 to 1960: Central Statistical Office, Thailand Population Census 1960 Whole Kingdom (Bangkok, Thailand: Government House Printing Office, 1960), p. 180. Figures from 1964 to 1968, Population of Thailand Sheet, Department of Local Administration (Mimeographed) Ministry of Interior. Figures from 1971 to 1981 are projected by NEDB, The Second National Economic and Social Development Plan (1967-1971), (Bangkok, Thailand: Government House Printing Office, 1968), p. 61.

population live on a subsistence level; many are underemployed in the agriculture sector. The economy depends on a few agricultural products which are still grown by traditional methods without modern technology. The main crops are rice, corn, kenaf, rubber and cassava.

The Economic Evaluation Group of Applied Scientific Research Corporation of Thailand reports that:

> Thailand is still overwhelmingly an agricultural country with more than 80 per cent of its economically active population engaged in agriculture, forestry, and fishing, and only 4 per cent in manufacturing industry. Thailand probably still has a much smaller fraction of its labor force engaged in the industrial sector than other countries in Asia.[8]

Primary products are unstable in price as well as in production. In the last decade Thailand has suffered from this problem. Statistics show that the rate of growth of agriculture has grown slowly as compared to the rate of import products. The First National Development Plan concentrated on infrastructure while a few development projects turned to agriculture. Farmers still depend on rainfall. This dependence is a definite obstacle to increased production.

In 1961 Thailand launched its first six-year plan known as the First National Economic and Social Development Plan. The plan was divided into two phases--the first phase was from 1961-1963 and the second phase from 1964-1966. The Six-Year Plan was followed by a Five-Year Plan (1967-1971).

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[8] Applied Scientific Research Corporation of Thailand, Appraisal Report No. 13: A Description of the Industrial Sector in Thailand (Bangkok, Thailand: Mimeographed, 1968), p. 4.

Because one-third of the Thai population lives in rural areas with traditional backgrounds, it is difficult for them to accept a rapid transition to a modern society. This creates many problems for government policy makers. It is true, as expressed by Kusum Nair, that:

> Development will not become a self-generating process with its own momentum unless the value system of community and the social structure containing it are first altered and adjusted to be in harmony with the socio-economic objectives of planning.[9]

If we assume, however, that their country can solve their national problems by launching a national economic development plan, the main problem is the priority of policy and projects involved. Albert O. Hirschman has stated that underdeveloped countries have enough natural resources but lack confidence and the power of decision. Economists are familiar with the idea of induced decision making and have identified the ability to make such decisions as a scarce resource; these conditions are typical of all the other scarcities and difficulties in underdeveloped countries.[10]

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[9] Kusum Nair, Blossoms in the Dust (New York: Frederick A. Praeger, 1963), p. 194.

[10] Albert O. Hirschman, The Strategy of Economic Development (New Haven, Connecticut: Yale University Press, 1969), pp. 26-27.

CHAPTER II

ECONOMIC DEVELOPMENT AND PLANNING

The idea that economic development is a process that makes people better off materially is generally accepted. Gerald M. Meier defines economic development as:

> The process whereby the real per capita income of a country increases over a long period of time.[1]

The widespread concept of economic development expressed by Benjamin Higgins is:

> A discernible rise in total and per capita income widely diffused among occupational groups and among regions and continuing for at least two generations. Fluctuations may take place around a long-run trend, but a rise in income for a decade or two followed by relapse into chronic stagnation over longer periods would not constitute development. The process will be accompanied by structural change, narrowing gaps in productivity among sectors and regions, and improved education and health.[2]

The United Nations has specified economic development as:

> A rapid increase in per capita income,
> a high level of employment
> a relatively stable price level,

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[1] Gerald M. Meier, Leading Issues in Economic Development Studies in International Poverty (New York: Oxford University Press, 1970), p. 7.

[2] Benjamin Higgins, Economic Development Principles, Problems and Politics (New York: W. W. Norton & Company, Inc., 1968), p. 33.

> equilibrium in the balance of payments,
> a reduction of inequalities in income distribution,
> the avoidance of marked disparity in the prosperity and growth of different regions with a country, and a diversified economy.[3]

The First Six-Year Plan which was set up by Thailand in 1961, though considered successful, was little known by people other than the policy-makers.[4] The plan was not consistent because NEDB compiled projects from other government organizations. As Dr. Vinyoo states:

> We cannot call it the perfect economic and social development plan. The perfect plan should include five components, namely: government sector, state trading, manpower planning, planning of rural areas or local government, and private sector planning.[5]

Theoretically, consistent characteristics of economic planning is described by J. Tinbergen as:

> (a) A plan refers to the future, i.e., it requires looking ahead.
> (b) It is based in a number of aims, which have to be specified in order to carry out the planning process.
> (c) It requires a coordinating means of economic policy to be used in order to reach the aims.[6]

Target of the First Six-Year Plan

The six-year National Economic Development plan began on January 1, 1961. It had the following main targets:

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[3] United Nations, Programming Techniques for Economic Development, with Special Reference to Asia and the Far East (Bangkok, Thailand: Economic Commission for Asia and the Far East, 1960), p. 6.

[4] Dr. Vichitvatakarn Vinyoo, Economic Planning (Bangkok, Thailand: Mimeographed for Graduate Department of Economics, Thammasat University, 1967), p. 67.

[5] Ibid., p. 68.

[6] Jan Tinbergen, Central Planning (New Haven, Connecticut: Yale University Press, 1954), p. 8.

(1) An annual increase in the national income of five percent and an increase in per capita income of at least three percent annually;
(2) A capital formation of not less than 15 percent of the National income each year;
(3) An increase in overall agricultural production of three percent annually, with special emphasis on diversified crops;
(4) Varying increases in such manufactured goods and mining products as cement, textiles, sugar, paper, gunny bags, tobacco, tin ore, lignite, and gypsum;
(5) Local power production of 370,000 kilowarrs, 1,000 kilometers of additional highways, 272 kilometers of railway lines;
(6) An annual increase of four percent of the country; exports and imports; and
(7) General improvement of the telecommunications, local services, education, and the balance of Trades.[7]

Most of the targets were reached and some were exceeded for the first half of the plan (1961-1963). Such products as rice, rubber, maize, cassava, fish, cement, gunny bags and tin ore were in excess of the targets which sugar, paper, electricity, tobacco, lignite, and gypsum were slightly below target as details in Table 2.

Following is the official evaluation of the First Six-Year Plan as expressed by the NEDB:

> The substantial increase in GDP, over 53 per cent during the entire plan period (1961-1966) indicates an average growth rate of 7.2 per cent per annum in real terms. In the first phase (1961-1963) the annual rate was 6.5 per cent against the target of 4.5 per cent rising to the average of 8 per cent against a target of 6 per cent in the second phase (1964-1966). In absolute terms, the GDP increased from 59.9 billion baht in 1961 to 92.1 billion baht in 1966. The growth trend during the plan period was favorably higher than the realized average rate in the pre-plan period of the 1950's. Per capita income at the end of 1966 amounted to 2,787 baht which was almost one-third higher than that of 1961 which stood around 2,137 baht per person.[8]

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[7] Special Correspondent, "Progress Under the Six-Year Plan," The Asia Monthly, XX (January/February, 1966), p. 6.

[8] NEDB, Evaluation of the First Six-Year Plan 1961-1966 (Bangkok, Thailand: Government Printing Office, 1967), p. 8.

Table 2. First half of the six-year plan, 1961-1963

Category	1959	1960	1961	1962	1963	Planned increase in 1963	Actual Increases
National Income (millions of baht)	41,683.1	47,683.1	50,068.2	54,535.9	57,862.6	5% yearly	6.1% over preceding year
Per capita income (baht)	1,636	1,806	1,841	1,948	2,009	At least 3% yearly	3.1% over preceding year
Rice production (metric tons)	6,769,766	7,834,506	8,176,626	9,253,888	10,168,380	1.3% yearly	9.9% over preceding year
Rubber production (metric tons)	174,000	170,800	186,100	195,400	198,200	At least 6% over 1959	13.9%
Maize production (metric tons)	317,000	544,000	598,000	665,400	857,700	100% over over 1959	170.6%
Cassava production (metric tons)	1,083,214	1,222,337	2,076,158	2,076,924	2,111,052	Not less than 15% over 1959	94 9%
Commercial fish catch (metric tons)	205,000	219,000	305,000	339,800	418,700	50% over 1959	104.2%
Cement production (metric tons)	566,395	542,977	800,284	967,475	997,231	50% over 1959	76.1%
Sugar production (metric tons)	120,000	140,000	150,000	151,344	125,031	8% over 1959	4.2%
Paper production (metric tons)	2,585	2,554	3,627	5,768	7,890	300% over 1959	205.2%
Gunny bag production (units)	6,060,000	6,869,000	8,842,091	10,815,942	23,128,987	50% over 1959	357.1%

Table 2. Continued

Category	1959	1960	1961	1962	1963	Planned increase in 1963	Actual Increases
Tobacco production (metric tons)	8,441	8,886	9,739	10,525	10,148	50% over 1959	20.2%
Tin ore production (metric tons)	13,433	16,757	18,386	20,323	21,617	40% over 1959	60.9%
Lignite production (metric tons)	109,538	107,783	108,396	135,224	137,073	200% over 1959	25.1%
Gypsum production (metric tons)	8,000	13,000	12,040	21,000	23,889	200% over 1959	198.6%
Installed capacity of electric generating plants (kilowatts)	88,630	93,630	171,544	168,544	238,508	Up to 370,000 KW	Up to 238,508 KW
Value of exports (millions of baht)	7,560	8,614	9,529	9,997	9,676	4% yearly	1.5% over preceding year
Value of imports (millions of baht)	8,988	9,622	10,287	11,504	12,803	4% yearly	11.3% over preceding year

Source: Asia Monthly, Vol XX, Jan/Feb., 1966.

Economic Indicators

Tables 3 and 4 show satisfactory growth of the Thai economy. The rate of per capita capital formation sharply increased from 12.6 percent of GDP in 1957 to 16.2 percent at the end of the First Year of the plan and then jumped to 26.6 percent of GDP in 1964. Table 5 shows the rate of annual growth of GDP from 1961 to 1966 which averaged 7.2 percent. The rate of per capita income increased to 5.2 percent and the gross fixed capital formation increased to 16.7 percent. The structural changes can be seen in Table 6.

Financing

The first plan was financed almost entirely from domestic sources. Figures in Table 7 state that 72.4 percent of all expenditures came from domestic finance and only 27.6 percent was financed by foreign sources through grants and technical assistance. The United States was the big donor country for all grants and technical assistance to Thailand as shown in Tables 8 and 9.

Agricultural Development

Development of agriculture during the first National economic development plan received slight attention. Details of projects are classified in Tables 10 and 11.

Table 3. Per capita income and capital formation (in U.S. dollars)

Year	Per Capita per cent of GDP	Per Capita Income
1957	12.6	92.2
1958	11.8	92.7
1959	12.8	96.6
1960	14.6	103.3
1961	16.2	106.8
1962	19.9	112.5
1963	24.9	115.0
1964	26.6	120.6

Source: National Income of Thailand, 1965 (Bangkok: Government House Printing Office, 1965).

Table 4. Gross Capital formation during the first plan, 1961-1966 (million of baht)

	1961	1966	1961-1966 Accumulated
I Construction	4,553.4	10,191.2	46,405.4
II Equipment	4,666.8	10,140.3	45,215.3
Gross fixed capital formation	9,220.2	20,331.5	91.620.7
III Change in inventories	425.4	679.7	3,162.1
Gross Capital Formation	9,645.6	21,011.2	94.782.8
Public Sector	2,978.5	6,038.0	25,538.4
Private Sector	6,667.1	14,973.0	69,244.4
Total	9,645.6	21,011.2	94,782.8

Source: NEDB, Evaluation of the First Six-Year Plan 1961-1968 (Bangkok, Thailand: Government House Printing Office, 1967), p. 11.

Table 5. Indicators of economic growth for the First Plan (at current prices)

	First Six-Year Plan 1961	1966	Annual Compound Growth rate 1961 to 1966
Gross National Product (GNP) (million of Baht)	59,876.0	92,230.8	7.2%
Per capita income (Baht)	2,137.2	2,786.8	5.2%
Private Consumption Expenditures (million of Baht)	43,861.4	61,630.2	7.3%
Gross Fixed Capital Formation (million of Baht)	9,220.2	20,331.5	16.7%

Source: NEDB, Evaluation of the First Six-Year Plan 1961-1966 (Bangkok, Thailand: Government House Printing Office, 1967), p. 9.

Table 6. Structural changes in GNP for the First Six-Year Plan (1961-1966)

	Percentage Distribution 1961	Percentage Distribution 1966
Agriculture	38.3	33.7
Manufacturing	11.4	13.9
Mining and Quarrying	1.5	1.7
Construction	3.8	4.6
Electricity and water supply	0.5	0.9
Transportation and Communication	6.5	6.9
Wholesale and Retail trade	17.4	18.7
Banking, Insurance and Real Estate	2.5	3.2
Ownership of Dwellings	4.5	3.7
Public Administration and Defense	4.9	4.4
Services	8.7	8.3
Total	100.0	100.0

Source: NEDB, Evaluation of the First Six-Year Plan 1961-1966 (Bangkok, Thailand: (Government House Printing Office, 1967), p. 10.

Table 7. Financing of the public development expenditure on the First Plan, 1961-1966 (million of baht)

Development Expenditure Financed by:	Planned	Actual
I. Domestic Resources		
Revenue Surplus	9,411	9,116
Government Bonds and Treasury Bills	5,045	6,866
Borrowing from the Bank of Thailand	3,712	2,294
State Enterprises and Local Government's resource	4,945	4,500
Treasury Balance (surplus)	-1,094	-2,751
II. Foreign Resources		
Loans	7,187	4,772
Grants	3,452	2,881
III. Total Resources	32,658	27,680
Domestic Resources as percentage of total	67.4%	72.4%
Foreign Resources as percentage of total	32.6%	27.6%

Source: NEDB, Evaluation of the First Six-Year Plan 1961-1966 (Bangkok, Thailand: Government House Printing Office, 1967), p. 15.

Table 8. Grants and technical assistance by donor during First Six-Year Plan, 1961-1966 (million of baht)

	1961	1962	1963	1964	1965	1966	1961 to 1966	%
U.S.A.	309.99	364.84	496.91	178.50	215.71	564.66	2,130.62	74.0
U.N.	32.48	55.75	31.65	66.41	65.96	68.01	320.27	11.1
Colombo Plan	24.64	22.24	48.88	53.08	76.46	91.99	317.29	11.0
Others	9.66	12.74	14.36	14.99	29.92	30.94	112.62	3.9
	376.77	455.57	591.80	312.98	388.05	755.60	2,880.80	100.0

Source: NEDB, Evaluation of the First Six-Year Plan 1961-1966 (Bangkok, Thailand: Government House Printing Office, 1967), p. 16.

Table 9. Grants and technical assistance by sectors, 1961-1966

	Million of Baht	%
Project Assistance		
1. Agriculture and Cooperatives	224.16	7.8
2. Industry and Mining	76.63	2.7
3. Power	56.56	1.9
4. Transport and Communications	636.65	22.1
5. Community Facilities and Social Welfare	290.54	10.1
6. Public Health	233.86	8.1
7. Education	283.68	9.8
Non-Project Assistance	1,078.68	37.5
Total	2,880.81	100.0

Source: NEDB, Evaluation of the First Six-Year Plan 1961-1966 (Bangkok, Thailand: Government House Printing Office, 1967), p. 17.

Table 10. Development of irrigation during the First Six-Year Plan

	Irrigated Area 1961	Planned Target for 1966	Actual Irrigated Area 1966
State Irrigation	8,615,000 rai	8,972,000 rai	9,666,110 rai
People's Irrigation	971,500 rai	1,912,050 rai	1,174,900 rai
Water Storage	210,000 rai	424,829 rai	360,000 rai
Water Conservation			500,000 rai
Total	9,796,500 rai	11,308,879 rai	11,701,010 rai

Source: NEDB, Evaluation of the First Six-Year Plan, 1961-1966 (Bangkok, Thailand: Government House Printing Office, 1967), p. 44.

Table 11. Irrigated area by region

	Total Paddy Cultivated Area	Total Irrigated	Percentage
Northern	8,475,222	1,170,700	13.8
Central	13,336,653	8,675,500	64.5
Northeastern	18,188,678	675,200	3.7
Southern	3,350,725	329,000	9.8

Source: NEDB, Evaluation of the First Six-Year Plan 1961-1966 (Bangkok, Thailand: Government House Printing Office, 1967), p. 45.

Manpower Structure

From 1960 to 1966, the structure of the labor force changed. Manpower engaged in agriculture declined while the number in manufacturing and tertiary industries increased. Table 12 indicates that in 1966 the employed manpower in agriculture was 79.9 percent of the total, a decline of 83.1 percent in 1961. Manufacturing employment was about 1 percent higher in 1966 as compared to 1960. In the commerce sector the rate of increase was 1.1 percent.

Table 12. Employed persons by economic sectors

	1961		1966	
	Persons	%	Persons	%
Agriculture	10,341,857	83.1	11,618,752	79.9
Mining and quarrying	28,443	0.2	41,486	0.3
Manufacturing	454,807	3.6	689,134	4.7
Construction	68,260	0.6	110,687	0.7
Electricity, gas and water	15,454	0.2	33,249	0.2
Transport and communication	164,142	1.3	228,449	1.6
Commerce	744,424	5.9	1.207,574	7.1
Services	643,595	5.1	804,304	5.5
Total	12,460,982	100.0	14,554,135	100.5

Source: NEDB, Evaluation of the First Six-Year Plan, 1966 (Bangkok, Thailand: Government House Printing Office, 1967), p. 29.

General Economic Effects

International trade

The trade balance in the whole plan period was a deficit of 13,248 million Baht (see Table 13). The service item showed a surplus though the net current account was in deficit. The net capital movement of both private and official funds was a surplus.

Internal economic effects

The figures in Table 14 show the rise in GDP, capital formation and the consumer's price index.

The Second Five-Year Plan (1967-1971)

The second plan was launched directly after the first Six-Year Plan and concentrated more on human capital or manpower problems. The principal policy guidelines for the second Five-Year Plan stated:

> (1) The Plan will strive towards further accelerating the economic growth rate. At the same time special emphasis will be given to more equitable distribution of income and social benefits.
>
> (2) Emphasis will be put on rural development as a measure to increase income of the rural population in remote areas, in order to reduce the degree of income inequality and geographical imbalance.
>
> (3) To expand employment opportunities and improve the quality of human resources, the Plan will emphasize the elevation of worker's skills to meet the economic and social demands of the society.
>
> (4) To accelerate private industrial investment, private economic activities will be strongly promoted and stimulated by the provision of necessary economic infrastructures and healthy environment within which private enterprise can prosper. The Government's role will be to assist but not to interfere or compete with private business activities.

Table 13. Average balance of payments, 1961-1966

	Million of Baht
1. Merchandise	
Exports	67,812
Imports	81,060[1]
Trade Balance	-13,248
2. Services	7,187
3. Transfer Payments (net)	
Private	827
Official	4,332
Current Account	- 802
4. Capital Movement (net)	
Private	5,622
Official	3,180
Net Errors and Omission	2,420
5. International Reserves Movement	10,320

Source: NEDB, Evaluation of The First Six-Year Plan 1961-1966, (Bangkok, Thailand: Government House Printing Office, 1967), p. 20.

[1]Excluding military imports.

Table 14. Combined economic indicators

Year	1 GDP*	2 Imports	3 Exports	4 Fixed Capital Formation	5 Imports of Capital Goods	6 Imports of Consumer Goods	7 Total Consumption	8 Consumer Index
1953	32,228	6,471	5,777	4,590	1,449	2,415	25,137	91.2
1954	34,642	7,021	6,177	na	1,442	2,400	na	92.5
1955	39,447	7,502	7,121	4,701	1,773	2,458	30,778	94.3
1956	41,088	7,655	6,923	6,883	1,849	3,083	32,048	93.7
1957	41,766	8,537	7,540	7,034	2,001	3,506	32,577	97.5
1958	42,360	8,237	6,447	8,233	1,927	3,399	34,396	103.7
1959	46,810	8,988	7,560	9,212	2,254	3,662	38,010	100.6
1960	53,113	9,662	8,614	9,706	2,367	3,627	43,128	96.4
1961	59.969	10,287	9,997	9,220	2,548	3,974	49,200	97.0
1962	65,307	11,503	9,529	11,639	3,248	3,973	52,873	100.0
1963	68,961	12,803	9,676	14,961	4,056	4,017	56,123	100.9
1964	73,809	14,253	12,339	16,942	4,242	4,377	59,440	102.9
1965	81,285	15,433	12,941	18,526	4,775	4,615	63,665	103.8
1966	96,810	18,504	14,099	20,331	5,701	5,238	70,438	107.8
1967	105,534	22,187	14,166	26,741	6,815	5,700	79,500	112.0

Source: NEDB, National Income of Thailand (Bangkok: Government House Printing Office, 1967).
*At current price.

(5) The primary emphasis will be put on the development of intensive agriculture, raising productivity by greater use of capital and improved techniques as a means to provide food and employment for a growing population, to provide basic materials for an expanding industry and to provide foreign exchange for the payment of imports.

(6) The Plan accentuates the role of science and technology, particularly the adaptation and application of modern knowledge to the special needs of the country.

(7) Economic and social development must be geared to the necessity to strengthen the national security.

(8) Financial stability must be maintained as a means of assuring healthy economy growth without disturbing the balance of the economy and of inspiring international confidence.

(9) Development of projects will be implemented in accordance with their priority and will be designed to yield the greatest benefit at the least possible cost.[9]

The projection of Gross Domestic Product in 1971 and the growth rate covering the plan period, as made by the NEDB, is shown in Table 15. The production targets for 1971 in agriculture, mining, and industry are shown in Table 16. Table 17 gives the allocation of funds by sectors.

Budget Expenditure

Tables 18 and 19 give revenue and expenditure for forecasts for fiscal years 1965 to 1970. Deficit financing was planned.

In the first year of the second plan the actual budget accounted for 18.30 percent of the GDP at current prices. In the fiscal year 1970 the percentage was up to 20.90 of the GDP.

Evaluation of the Second Plan

In many ways it is too early to evaluate the second plan, but based on general economic indicators in this period, the general view of the development

Table 15. Gross Domestic Product of Thailand, 1965-1971 (million of Baht)

	Actual 1965		Target 1971		Annual
	GDP	% Distribution	GDP	% Distribution	Growth Rate 1966--1971
Agriculture	26,090.1	32.1	34,031.7	26.2	4.3
Mining & Quarrying	1,889.0	2.3	2,659.6	2.0	6.6
Manufacturing	10,945.7	12.3	17,781.4	13.6	10.9
Construction	4,284.2	5.3	7,577.7	5.8	11.4
Electricity & Water Supply	673.5	0.8	1,369.6	1.0	14.4
Transportation & Communications	5,920.0	7.3	11,217.4	8.6	11.0
Wholesale & Retail Trade	15,002.6	18.5	23,380.9	18.6	8.5
Banking, Insurance, Estate	2,770.5	3.4	7,537.7	5.8	17.0
Ownership of Dwellings	3,550.2	4.4	4,548.3	3.5	5.0
Public Administration and Defense	3,738.0	4.6	7,741.2	5.9	12.0
Service	7,321.3	9.0	11,960.4	9.1	9.5
Gross Domestic Product	81,285.1	100.0	130,795.8	100.0	8.5

Source: Thailand Official Yearbook of 1968 (Bangkok, Thailand: Government House Printing Office, 1968), p. 368.

Table 16. Production targets 1971

Production	Unit	Actual Production 1965	Production Targets 1971
Agriculture:			
Paddy	ton	9,218,000	13,700,000
Maize	ton	1,000,000	1,500,000
Rubber	ton	217,400	250,000
Kenaf	ton	420,000	500,000
Cassava	ton	2,340,000	2,500,000
Soybean	ton	33,000	50,000
Mung bean	ton	120,000	200,000
Groundnut	ton	121,000	185,000
Cotton	ton	13,000	45,000
Castor bean	ton	32,000	55,000
Tobacco	ton	62,000	88,000
Mining:			
Tin ore	ton	26,419	32,000
Lignite	ton	124,967	4,417,000
Manganese	ton	33,428	50,000
Fluorite	ton	51,829	60,000
Gypsum	ton	11,240	50,000
Industry:			
Cement	ton	1,247,998	2,800,000
Gunny bags	unit	39,992,310	65,000,000
Paper	ton	13,330	60,000
Chemical fertilizer	ton	---------	30,000
Car assembly	unit	8,692	250,000
Tires	unit	140,000	300,000
Steel	ton	100,000	400,000
Oil refinery	million barrels	13.1	18.0

Source: Thailand Official Yearbook, 1968 (Bangkok, Thailand: Government House Printing Office, 1968), p. 370.

Table 17. Sectoral allocations of development expenditures in the First and Second Plans (millions of baht)

Sector	First Plan 1961-1966	Percentage	Second Plan 1967-1971	Percentage
Agriculture	4,600	14.15	11,310	19.68
Industry and Mining	2,600	7.94	915	1.59
Power	4,300	13.26	4,970	8.75
Transport & Communications	10,200	31.42	17,100	29.75
Commerce	---	---	180	0.31
Community Facilities	5,500	16.74	10,275	17.87
Health	1,400	4.18	2,570	4.47
Education	2,500	7.63	6,610	11.50
Unallocated	1,500	4.78	3,550	6.18
Total	32,600	100.00	57,480	100.00

Source: Thailand Official Yearbook, 1968 (Bangkok, Thailand: Government House Printing Office, 1968), p. 371.

Table 18. Comparative government's revenue and expenditure (millions of baht)

Fiscal Year	Forecast Revenue	Budget	Deficit Budget	
			Amount	Percentage of Expenditure
1965	10,570.0	12,870.9	2,300.0	17.87
1966	12,240.0	15,140.0	2,900.0	19.15
1967	14,522.1	19,228.3	4,706.2	24.48
1968	16,478.0	21,262.0	4,784.0	22.50
1969	17,748.2	23,960.0	6,079.0	25.37
1970	19,711.0	27,299.9	8,180.0	23.96
Total	90,711.0	146,760.0	55,949.1	38.12

Source: Bureau of Budget, Comparative Revenue and Expenditure No. 1 (Bangkok, Thailand: Government House Printing Office, 1970), p. 16.

Table 19. Comparative government expenditure with GDP at current prices (millions of baht)

Fiscal Year	GDP Current Prices	Budget	Actual Expenditure	(3) - (2) %	(4) - (2) %
1964	76,791.4	11,430.0	10,630.4	14.88	13.84
1965	82,874.9	12,870.0	12,421.5	15.53	14.99
1966	91,308.3	15,140.0	14,625.8	16.58	16.02
1967	107,878.6	19,743.6	19,008.2	18.30	17.62
1968	114,614.2	21,262.0	19,394.7	18.55	16.92
1969[p]	130,604.8	27,299.0	---	19.47	---
1970[p]	130,604.8	27,299.9	---	20.90	---

Source: Bureau of Budget, Comparative Revenue and Expenditure No. 1 (Bangkok, Thailand: Government House Printing Office, 1970), p. 19.

process is favorable. The growth rate dropped in 1967 to 4.6 percent, then sharply increased to 8.5 percent in 1968, with the same expected rate for 1969. The indicators in Table 20 show the advancement of the economy during the Second Plan period.

On the negative side there is a big gap between imports and exports. For the past two decades there had been a deficit in the balance of trade. This is shown in Table 21.

Table 20. General economic indicator of 1967-1969 (millions of baht)

Year	Growth	Export	Import	Balance of Trade	Balance of Payment	Money Supply	GDP Current Price	GNP	Consumer Index 1962-100
1967	4.6%	14.166	22,188	- 8,022	+1,274	17,713.1	105,534.8	107,878.4	112.0
1968	8.5%	13,679	24,103	-10,424	+ 447	19,370.4	114,614.2	115,429.1	114.4
1969	8.5%[p]	14,603	25,630	-11,027	- 997	20,308.9	123,056.8	126,973.0	116.8

Source: Bank of Thailand Monthly Bulletin (September, 1970).
p = preliminary.
NEDB, 1969 Annual Plan (Bangkok, Thailand: Government House Printing Office, 1969).

Table 21. U.S.R. & R. and military expenditures (millions of baht)

	1961	1962	1963	1964	1965	1966	1967	1968	1969
R & R						213	366	420	416
Military Expenditures	77	205	361	439	922	2582	4107	4918	4200
Total	77	205	361	439	922	3795	4473	5338	4616
(in U.S. $ million)	3.7	9.8	17.3	21.1	44.3	182.4	215.0	256.6	222.0

Source: Dr. Puey Ungphakorn "Thailand's Economic Prospects," Bank of Thailand Bulletin (February, 1970), p. 55.

CHAPTER III

TRENDS OF MAIN PRIMARY PRODUCTS

The main component of the Gross Domestic Products of Thailand are its primary products. Agriculture accounted for 44 percent of GDP in 1951, 32 percent in 1965, and 30 percent in 1968. The agricultural sector contains crops, livestock, fisheries and forestries. Crops include: food crops, garden crops, fruits, and miscellaneous crops.[1] It is generally accepted that agriculture represents an important role in the economy, both internally and externally. This study is focused on Thailand's six main crops: rice, rubber, maize, cassava, kenaf, and jute.

Rice

Rice is the main domestic food and export product of Thailand. The United Nations estimated the elasticity of demand for rice in Thailand to be 0.22, which means the demand for rice is inelastic with respect to its price. The production of rice from 1950 to 1967 almost doubled. This increase can be attributed to the expansion of the area planted and a higher average yield per

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[1] Ministry of Agriculture, Agricultural Statistics of Thailand, 1964 (Bangkok, Thailand: Office of the Under Secretary of State, 1966), pp. 12-13.

[2] United Nations, Food Agriculture Organization, Agricultural Commodities Projections for 1975 and 1985 (FAO Report, Vol. II), 1967, p. 234.

Rai as shown in Table 22.[3] Modern techniques have not been used by Thai farmers, nor are they using chemical fertilizers. As J. R. Behrman states:

> Most of the chemical fertilizer, which is used in Thailand, moreover, is not used for crops of concern, but for vegetable crops, tobacco, and mulberry bushes. Because chemical fertilizers are sometimes elevated almost to the position of panacea for the problems of underdeveloped agriculture, the reasons for their limited use in Thailand deserve some comment. One major reason apparently is the high cost of fertilizer relative to crop prices.[4]

Many Thai farmers are still dependent upon rainfall because feeder canals from irrigation reservoirs have not yet been built. The Bangkok Bank reports:

> Despite the completion of several large-scale irrigation projects, crop cultivation in Thailand still very much depends upon the regularity of rainfall. This is because the construction rate of feeder canals leading from the reservoirs to the farm lands had to be slowed down for lack of sufficient funds. As a result, most of the cultivated area still remain outside the existing irrigation network, thereby making it impossible for agricultural production either to be stepped up at will or to be maintained at a steady level.[5]

Rubber

Rubber is the second main export-earning crop and is produced in southern Thailand. The government gives priority in the budget to replanting

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[3] Rai is equivalent to 0.4 acre or 0.16 hectare.

[4] J. R. Behrman, Supply Response in Underdeveloped Agriculture (Amsterdam, Holland: North-Holland Publishing Company, 1968), p. 88.

[5] Bangkok Bank Ltd., Annual Report 1969 (Bangkok, Thailand: Thai Wattana Phanich Press Company, Ltd., 1970), p. 35.

Table 22. Rice: area, production, and prices

Crop Year	Planted area '000 Rai	Harvested area '000 Rai	Average yield Kg. per Rai	Production '000 tons	Wholesale Price Baht per Kwien
1949/50	32,926	31,016	215	6,684	711.93
1950/51	34,625	33,091	205	6,782	765.35
1951/52	37,245	35,851	204	7,325	820.04
1952/53	33,551	32,064	206	6,602	729.81
1953/54	38,575	37,068	222	8,239	645.85
1954/55	43,732	28,294	202	5,709	825.00
1955/56	36,060	33,598	218	7,334	863.33
1956/57	37,648	36,013	230	8,297	859.32
1957/58	31,717	26,794	208	5,570	1,021.96
1958/59	35,987	32,306	218	7,053	830.77
1959/60	37,909	32,893	206	6,770	850.96
1960/61	37,008	35,270	222	7,834	912.04
1961/62	38,619	35,349	231	8,177	1,096.57
1962/63	41,618	38,696	240	9,279	955.08
1963/64	41,256	39,715	253	10,028	954.31
1964/65	40,872	37,316	256	9,558	812.33
1965/66	40,491	37,034	249	9,217	1,282.00
1966/67	46,096	42,987	276	11,845	1,343.00
1967/68	40,064	35,006	274	9,594	1,239.00
1968/69	44,681	39,117	275	10,772	1,211.00

Source: Agricultural Statistics of Thailand, 1964 (Bangkok, Thailand: Office of the Under-Secretary of State, 1966), p. 46.
Figures from 1965-1969 are from Bank of Thailand Monthly Bulletin, X (August, 1970), p. 77.
Rai is equivalent to 0.4 acre; Kwien is equivalent to 2 cubic meters; 20.80 Baht is equivalent to U.S. $.

programs.[6] According to the government replanting program, the planter receives a subsidy of 2,000 Baht per Rai. The main purpose of this program is to improve quality so that Thai rubber can compete with rubber produced by neighboring countries. In Table 23 it is clearly seen that the production, tappable area, and value of Thai rubber are increasing.

Maize

Maize or corn has been cultivated in Thailand since World War II. It is mainly cultivated in the Central Plain as well as some parts of the northern regions of Thailand. The domestic demand has been slight since maize cannot be substituted for rice, so about 80 percent of the total output is exported. Corn production has rapidly increased since 1950--the area cultivated in 1960 was eight times that of 1950. The actual output in 1960 was 543,900 tons, which exceeds the output of 26,900 tons in 1950 as shown in Table 24.

Cassava

Cassava is an upland food crop which is mainly cultivated on the east coast of the Cholburi province of Thailand. To meet the market demand it is necessary to convert cassava root to cassava meal. The ratio of conversion is 392 kg. of meal per ton of roots.[7] Area planting and production has been rising

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[6] National Economic Development Board, 1969 Annual Plan (Bangkok, Thailand: Government House Printing Office, 1969), p. 5.

[7] Agricultural Statistics of Thailand (Bangkok, Thailand: Office of the Under Secretary of State, 1966), p. 58.

Table 23. Rubber: area, production, and market value

Year	Tappable Area '000 Rai	Average Yield Kg. per Rai	Production '000 tons	Wholesale Baht per Kg.	Value Mill. Baht
1955	1918	70	119.6	8.07	965.2
1956	2011	68	133.3	13.46	1,794.2
1957	2106	67	136.7	11.13	1,521.5
1958	2203	68	136.0	10.70	1,455.2
1959	2302	70	140.6	9.50	1,335.7
1960	2400	72	174.0	12.28	2,136.7
1961	2501	74	170.8	12.90	2,203.3
1962	2597	75	186.1	9.60	1,786.6
1963	2688	74	195.4	8.47	1,655.0
1964	2772	76	198.2	7.90	1,565.8
1965	2853	76	210.5	7.57	1,593.5
1966	3330	66	218.1	7.45	1,624.8
1967	3970	55	219.3	5.82	1,276.3

Source: Agricultural Statistics of Thailand, 1967 (Bangkok, Thailand: Office of the Under-Secretary of State, 1970), p. 99. See also Agricultural Statistics of Thailand, 1964 (Bangkok, Thailand: Office of the Under-Secretary of State, 1966), p. 66.

Table 24. Maize: area, production, and market value

Year	Area Planted '000 Rai	Average Yield Kg. per Rai	Production '000 tons	Wholesale Price Baht per Kg.	Value Million Baht
1950	211	127	26.9	1.08	29.1
1951	256	163	41.7	1.50	62.6
1952	271	165	44.8	1.03	46.1
1953	295	173	51.1	1.50	76.6
1954	326	191	62.3	1.30	81.0
1955	345	196	67.5	1.20	81.0
1956	510	225	114.8	1.16	133.2
1957	597	229	136.8	0.96	131.3
1958	783	238	186.3	1.04	193.8
1959	1,241	256	317.2	1.00	317.2
1960	1,779	306	543.9	1.01	549.3
1961	1,863	321	598.3	1.12	670.1
1962	2,009	331	665.4	1.01	672.1
1963	2,428	353	857.7	1.06	909.2
1964	3,384	276	935.1	1.08	1,009.9
1965	3,510	291	1,021.3	1.22	1,246.0
1966	3,689	304	1,122.4	1.12	1,257.1
1967	4,185	290	1,212.3	1.17	1,494.8

Source: Agricultural Statistics of Thailand, 1967 (Bangkok, Thailand: Office of the Under-Secretary of State, 1970), p. 54.

at an average annual rate of 30 percent in recent years. Over 70 percent of this growth rate was due to expansion in planted area.[8] Cassava meal is exported in the form of tapioca to the United States, Belgium, West Germany, the Netherlands, and Japan.[9] Unfortunately, the First Six-Year Plan and the Second Five-Year Plan made no allocations to the cassava crop. Table 25 shows the potential of cassava.

Kenaf and Jute

Kenaf and jute are fiber crops which are produced in the northeast part of the country. Since rice farmers in this region often suffered from droughts and floods, they searched for other cultivated crops and found that kenaf and jute could be grown in the upland area. Behrman cited:

> Production [of kenaf] expanded at an average annual rate of over 46 per cent, and export expanded at an average annual rate of over 47 per cent. The rapid expansion of production was accompanied by an even more rapid expansion in area planted. Most observers of this phenomenal expansion of kenaf production in Thailand attribute its occurrence primarily to price responsiveness.[10]

The general data of kenaf and jute production can be seen in Tables 26 and 27 respectively. There is demand for kenaf and jute in the domestic

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[8] Behrman, p. 120.

[9] Bank of Thailand Monthly Bulletin, X (August, 1970), p. 57.

[10] Behrman, p. 142.

Table 25. Cassava: area, production, and market value

Year	Area Planted	Production		Cassava Meal Wholesale	Market Value
		Roots	Cassava Meals		
	'000 Rai	('000 tons)		(Baht per Kg.)	Million Baht
1956	245	396	155.2	0.75	116.4
1957	240	418	163.8	0.75	122.8
1958	276	487	190.9	0.75	143.2
1959	391	1,083	424.5	0.87	369.3
1960	447	1,222	479.0	0.63	301.8
1961	621	1,726	676.6	0.65	439.8
1962	767	2,077	814.2	0.86	700.2
1963	875	2,111	827.5	0.62	513.0
1964	656	1,557	610.3	0.55	335.7
1965	637	1,475	578.2	0.70	404.7
1966	814	1,892	741.7	0.72	534.0
1967	880	2,063	808.3	0.59	476.7

Source: Agricultural Statistics of Thailand, 1967 (Bangkok, Thailand: Office of the Under-Secretary of State, 1970), p. 58.

Table 26. Kenaf: area, production, and market value

Year	Area Planted	Average Yield	Production	Wholesale Price	Value
	'000 Rai	Kg. per Rai	'000 tons	Baht per Kg.	Million Baht
1950	30	156.7	4.7	1.91	9.0
1951	85	235.3	20.0	1.75	35.0
1952	66	198.5	13.1	4.41	57.8
1953	60	233.3	14.0	1.0	14.0
1954	36	227.8	8.2	1.87	15.3
1955	52	188.5	9.8	2.85	27.9
1956	108	157.4	17.0	3.04	51.7
1957	78	228.2	17.8	2.58	45.9
1958	127	233.1	29.6	2.30	68.1
1959	277	180.5	50.0	2.24	112.0
1960	870	208.4	181.3	3.17	574.1
1961	1,681	201.8	239.3	3.61	1,224.9
1962	700	192.0	134.0	2.33	312.2
1963	950	222.9	211.7	2.73	577.9
1964	1,346	225.2	303.1	2.75	833.5
1965	2,331	227.0	528.6	3.02	1,596.4
1966	3,110	213.0	661.4	3.30	2,182.6
1967	2,141	197.0	421.4	1.98	834.4

Source: Agricultural Statistics of Thailand, 1967 (Bangkok, Thailand: Office of the Under-Secretary of State, 1970), p. 84.

Table 27. Jute: area and production

Year	Area Planted '000 Rai	Average Yield Kg. per Rai	Production '000 tons	Wholesale Price Baht per Kg.
1950	17	147.0	2.5	1.25
1951	21	142.9	3.0	1.92
1952	7	142.9	1.0	4.41
1953	10	180.0	1.8	1.00
1954	8	162.5	1.3	1.87
1955	10	130.0	1.3	2.26
1956	14	178.6	2.5	3.08
1957	12	233.3	2.8	2.53
1958	13	223.1	2.9	2.29
1959	17	229.4	3.9	2.25
1960	26	238.5	6.2	3.24
1961	63	184.1	11.6	3.64
1962	44	150.0	6.7	2.97
1963	33	208.0	6.9	2.73
1964	32	200.0	6.5	2.85
1965	48	182.0	8.7	3.12
1966	60	181.6	10.9	3.24
1967	43	171.0	7 4	3.39

Source: Agricultural Statistics of Thailand, 1967 (Bangkok, Thailand: Office of the Under-Secretary of State, 1970), p. 82.

kenaf-mills industry. This industry began in 1951 and is now comprised of ten mills--four government-owned and six privately-owned.[11] The major product of the industry is gunny-sacks which are made wholly from Thai kenaf. Production of gunny-sacks in 1967 was almost 50 million, of which 14 percent were exported as empty sacks and 40 percent were filled sacks.

Development Expenditures to Agriculture

The First Six-Year Plan (1961-66) set a target of 4,600 million Baht to be allocated to agriculture. This was third in priority to transportation and communication, and community facilities which were allocated 10,200 million Baht and 5,500 million Baht respectively. In the Second Five-Year Plan (1967-71) it was planned to allocate to agriculture 11,300 million Baht which was second in priority to transportation and communication as shown in Table 28. In Table 29 the 1968 annual plan allocated 2,000 million Baht to agriculture; this accounted for 15.7 percent of the total expenditures; and in the 1969 annual plan expenditures for agriculture were 16.1 percent of the total. The Bangkok Bank indicates the following concerning this period:

> . . . total agricultural production last year (1969) was at a higher level than in the lean years of 1967 and 1968. Despite this, however, the development rate of the agricultural sector was very disappointing when compared with the more rapid progress achieved in other sectors of the economy.[12]

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[11] Applied Scientific Research Corporation of Thailand, Appraisal Report No. 13 Description of the Industrial Sector in Thailand (Bangkok, Thailand: Mimeographed, 1967), p. 40.

[12] Bangkok Bank Ltd., Annual Report, 1969 (Bangkok, Thailand: Thai Wattana Phanich Press Co., Ltd., 1970), p. 33.

Table 28. Development expenditure in the First and Second Plan (millions of baht)

Sector	First Plan 1961-66	%	Second Plan 1967-71	%
Agriculture	4,600	14.15	11,300	20.23
Industry and Mining	2,600	7.94	885	1.58
Power	4,300	13.26	3,540	6.31
Transport and Communications	10,200	31.42	17,080	30.58
Commerce	--	--	180	0.32
Community Facilities	5,500	16.74	10,250	18.35
Health	1,400	4.18	2,570	4.60
Education	2,500	7.63	6,520	11.67
Unallocated	1,500	4.78	3,550	6.36
Total	32,600	100.0	55,875	100.0

Source: C. Cook, "Thailand Problems for the Future," Eastern World (January/February, 1968), p. 4.

Table 29. Sectoral development allocations for 1968 and 1969 (millions of baht)

Sector	1968 Annual Plan Amount	1968 Annual Plan % of Total	1969 Annual Plan Amount	1969 Annual Plan % of Total	% difference between 1968 and 1969
Agriculture	2,000	15.7	2,477	16.1	17.9
Industry Mining and Commerce	148	1.1	130	0.8	-12.1
Transportation & Communication	3,651	27.4	4,317	28.1	18.2
Power	1,238	9.3	1,301	8.5	5.1
Social Welfare	1,496	11.2	1,521	9.9	5.1
Health	620	4.7	670	4.4	8.1
Education	3,085	23.1	3,802	24.8	23.2
Others	999	7.5	1,132	7.4	13.3
Total	13,337	100	15,350	100	15.1

Source: National Economic Development Board, Annual Plan, 1969 (Bangkok, Thailand: Government House Printing Office, 1969), p. 3.

CHAPTER IV

THE IMPORT LEAKAGE FROM THAILAND

The Propensity to Import

Like all underdeveloped countries, the propensity to import, both average and marginal, is very high in Thailand. This reduces the funds available for capital investment and slows the development process. In Table 30 the crude values have been calculated. It shows that in the 1960's the average propensity to import was .21, and the average marginal propensity to import was .33. The average income elasticity of demand for imports was 1.6.

Table 30. Thailand's average propensity to import and marginal propensity to import

Year	NI	Imports (M)	$\frac{M}{NI}$	$\frac{\Delta M}{\Delta NI}$	$\%\frac{\Delta M}{\Delta NI}$
	(1)	(2)	(3)	(4)	(5)
1959	44,358.6	8,988	.20		
1960	48,910.6	9,622	.20	0.14	0.7
1961	52,308.2	10,287	.20	0.31	1.01
1962	56,863.5	11,503	.20	0.26	1.37
1963	58,818.7	12,803	.21	0.66	3.6
1964	63,368.1	14,253	.22	0.32	1.5
1965	69,449.3	15,433	.22	0.19	0.9
1966	78,752.9	18,504	.23	0.33	1.4
1967	86,426.5	22,187	.25	0.48	2.1
		Average	0.21	0.33	1.6

Source: Bank of Thailand, Monthly Bulletin, X (August, 1970), Columns 3, 4, and 5 calculated by author.

Some Macro Relationships

Based on 1958-1967 data, the following linear relationships were found to exist.

I. Consumption function

$$C = -2197.62500 \text{ million Baht} + 0.85029\ Y_d$$
$$(0.05696)$$
$$T\ 14.92704$$
$$F222.81638 \qquad R^2\ .95$$
$$d.f\ 9$$

II. Export function

$$X = 17.51563 \text{ million Baht} + 0.17533\ NI$$
$$(0.01864)$$
$$T\ 9.40889$$
$$F88.52719 \qquad R^2\ .90$$
$$d.f\ 9$$

III. Import function

$$M = -3966.71875 \text{ million Baht} + 0.28371\ NI$$
$$(0.01092)$$
$$T\ 25.97290$$
$$F\ 674.59253 \qquad R^2\ .99$$
$$d.f\ 9$$

where: C = Consumption
X = Exports
M = Imports
Y_d = Disposable Income
NI = National Income
R^2 = Coefficient of determination
d.f. = Degree of freedom

All three equations are "statistically significant" at the 0.1 percent level according to the t-test and F-test. From equation I, a marginal propensity to consume (MPC) of 0.85029 was calculated. This indicates that if disposable income increases 100,000 Baht, consumption will increase 85029 Baht. If the marginal propensity to consume (MPC) plus the marginal propensity to save (MPS) equals 1, then the MPS in this case would be .15, therefore the multiplier can be obtained accordingly.

From Equations II, and III, the marginal propensity to export (MPE) and the marginal propensity to import (MPI) are 0.17533 and 0.28371 respectively. The MPI is greater than the MPE, which is generally true of developing countries. The result has been a growing trade deficit as shown in Table 31.

Table 31. Economic indicators of export sector of Thailand

Period	Balance of Trade			Balance of Payment	Rice Export		Rubber Export	
	Exports (f.o.b)	Imports (c.i.f.)	Balance (+)	Balance (+)	Metric Tons	Million Baht	Metric Tons	Million Baht
1960	8,614	9,622	- 1,008	NA	1,202,772	2,570	169,655	2,579
1961	9,997	10,287	- 290	+1,646.6	1,575,998	3,598	148,598	2,130
1962	9,529	11,504	- 1,975	+1,294.9	1,271,023	3.240	194,180	2,111
1963	9,676	12,803	- 3,127	+ 948.7	1,417,673	3,424	186,887	1,902
1964	12, 339	14,253	- 1,914	+1,436.9	1,896,258	4,389	216,993	2,060
1965	12,941	15,433	- 2,492	+1,706.0	1,895,223	4,334	210,854	1,999
1966	14,099	18,504	- 4,405	+3,287.0	1,507,550	4,001	202,535	1,861
1967	14,166	22,188	- 8,022	+1,274.0	1,482,272	4,653	211,118	1,574
1968	13,679	24,103	-10,424	+ 447.0	1,071,830	3,787	252,219	1,815
1969	14,603	25,603	-11,027	- 997.0	1,000,037	2,887	274,648	2,689

Table 31. Continued.

Maize Export		Kenaf and Jute Export		Tapioca Products		Tin Export	
Metric Tons	Million Baht	Metric Tons	Million Baht	Metric Tons	Million Baht	Metric Tons	Million Baht
514,745	551	61,769	230	270,758	289	17,114	537
567,236	597	143,477	626	443,362	446	18,104	617
472,405	502	237,898	579	400,788	423	19,841	685
744,046	828	125,753	358	427,443	439	22,003	741
1,115,041	1,346	162,095	495	738,859	653	22,339	962
804,380	969	316,986	1,102	719,442	676	20,503	1,166
1,218,537	1,520	473,011	1,613	688,603	644	18,898	1,316
1,090,762	1,355	317,094	866	781,357	726	27,108	1,822
1,480,657	1,555	285,324	675	875,608	761	23,886	1,501
1,629,531	1,671	254,197	772	969,589	874	23,431	1,632

Source: Bank of Thailand, Monthly Bulletin, X (August, 1970), 45-65.

CHAPTER V

GOVERNMENT AID TO AGRICULTURE: A FIRST LOOK

This chapter focuses on the role of government aid to agriculture for the last economic development plan period (1961-1971). Attempts will be made to show that the role of government spending on particular primary products has been "statistically significant."

Government spending has been largely confined to two major crops: rice and rubber during the first and second National Economic Development Plans.

Five major annual crops, however, namely: rice, rubber, maize, kenaf or jute, and cassava played significant roles in international trade during the last decade.

Production Functions

Two types of production functions have been estimated for each of these crops and some others by means of a stepwise linear regression program. They are:

I. (Output) $Y = F(A_t, R_t, G_t)$

II. (Yield) $Y_d = F(A_t, R_t, G_t)$

In cases where G_t is not available, a dummy variable is used.

List of Variables

Y = Output: measured in metric tons per annum.

Y_d = Average Yield: measured in kilogram per rai.

A_t = Area planted at t period: measured in rai. Rai is equivalent to 0.16 hectare or 0.395 acre.

R_t = Average annual rainfall: measured in m.m.

G_t = Accumulated government research expenditures in real terms.

D_t = Dummy variable.

Output (Y) and Yield (Y_d)

In the equations presented in this study, the dependent variable is an output or yield as specified. Both output (Y) and yield (Y_d) are measured in final products annually. All figures used for computations in this chapter are government time series data obtained from Agricultural Statistics of Thailand, 1967, published in 1970 by the Thai government.

Area Planted (A_t)

The production of all primary products is mainly dependent on the area planted. It is obvious that the larger the area planted, the greater the output there will be. The area planted has been increasing during the period studied. In fact, much of the increase in output of the last decade is contributed to more extensive farming and not to any increase in land productivity. Some steps in this later direction might be desirable.

Accumulated Government Research Expenditures (G_t)

Only rice and rubber have been included in the government research budget. It is generally believed that government research in one year will affect agricultural production in subsequent years so this variable is compiled on an accumulative basis,

$$G_t = \sum_{i}^{j} G_{ij}$$

Government Rice Research

Research programs for improving rice varieties are well under way. Development and testing of high yield rice, suitable for various local soils has been carried out at various experimental stations. Many of these stations are small and, in most cases, understaffed. On the extension side there have been programs to promote the organization of farmer groups, the distribution of fertilizer, and the arrangement of exhibitions in 44 provinces.[1]

Money was also expended for research on diseases, on new technology, and on new machinery and equipment. Also a new experiment station was built in the Chao Phraya Basin.[2]

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[1] NEDB, Performance Evaluation of Development in Thailand for 1965 (Bangkok, Thailand: June, 1966), pp. 23-24.

[2] NEDB, National Economic Development Plan, 1961-1966 (Bangkok, Thailand: Prachacang Press, 1964), p. 183.

Rubber Research

Rubber research has emphasized development of high yield trees, promotion of new plantings and of better methods of maintenance of rubber estates. The Rubber Research Institute was set up at Koh Hong, Haadyai and Songkla in cooperation with the U. N. Special Fund to develop the necessary technology and manpower to undertake these tasks. Time series data is available from 1956 to 1967.

Annual Rainfall (R_t)

Much of Thailand is not irrigated, therefore, agricultural production is dependent on the level of rainfall. The main priority for dams built in this period was for energy development and was not for agricultural purposes. As a result, there is a shortage of feeder canals.

Dummy Variable (D_t)

Except for rice and rubber, help has been given to other farmers in a more general way through general government expenditures. No specific breakdown of this help is available from the budget; so a dummy variable is used to represent this assistance, though, of course, it may represent many other influences as well.

$D_t = 0$ for the years before 1960, and $D_t = 1$ for 1960 onward when the country launched the First National Economic Development Plan.

CHAPTER VI

SIMPLE PRODUCTION FUNCTION ANALYSIS

Rice

The results of the analysis of rice production from 1938 to 1969 are found in Table 32.[1] The result of the third step indicates that of the three variables government research expenditures have most affected the yield per rai. Neither rainfall nor area planted added much to the value of R^2. Rainfall was, however, negatively related with yield. This would indicate that Thailand, a tropical country, has in many years to worry about too much rain, seldom about too little. Natural rainfall cannot be controlled but some drainage systems are being built to carry away the excess. These systems are being built directly for power purposes and the irrigation and drainage benefits to rice have been treated as an incidental. The area planted to rice has changed very little in the past 10 years and expansion is unlikely in the future. Government research, therefore, probably offers the best hope for expanded rice production if that is desired. As mentioned earlier in Chapter V, the government is involved in developing new high field rice varieties in soil development and distribution of fertilizer in control of diseases, and in the provision to producers of machinery and equipment.

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[1] The estimated regression coefficients for rice, rubber, maize, kenaf, jute, cassava, cotton and ground nuts have been performed by BMDO2R-Stepwise Regression. This computer program will give the correlation matrix, analysis of variance, R^2, and F-ratio for each step, and the lists of residuals.

Table 32. Estimated regression coefficients of rice (1938-1969)

Step Number	R^2	F-Ratio	Explanatory variables			
			Intercept	A_t	R_t	G_t
	Regression variables on yield					
1	.659	58.01*	219.-5704			.19277
						(.02531)
2	.689	32.08*	224.35399		-0.00553	.20816
					(.00333)	(.02629)
3	.691	20.90*	215.23994	.00038	-0.00845	.19923
				(.00077)	(.00687)	(.03235)

Note: Figures in parentheses are standard error of estimates. T-value of each coefficient can be obtained by dividing each coefficient by its standard error of estimate.

*Statistically significant at 0.1%.

Table 33 presents the correlation coefficients.

Table 33. Correlation coefficients of all variables--rice

Yield	A_t	R_t	G_t	
1.000	.358	.125	.812	Yield
	1.000	.871	.568	A_t
		1.000	.353	R_t
			1.000	G_t

Source: Calculated by the author.

Rubber

The results of the analysis of rubber production from 1948 to 1967 is given in Table 34. The fit was not as good in this case with an R^2 of only .323 for all three variables. Again rain was an adverse effect on yields as heavy rains generally coincide with the tapping or harvest season.

Table 34. Estimated regression coefficients--rubber (1948-67)

Step Number	R^2	F-Ratio	Explanatory variables			
			Intercept	A_t	R_t	G_t
	Regression variables on yield					
1	.274	6.81**	91.82401		-.01175	
					(.00451)	
2	.286	3.410***	91.52228		-.01185	.01614
					(.00460)	(.03021)
3	.323	2.543***	103.01274	-.00564	-.01257	.10116
				(.00607)	(.00468)	(.09642)

**Statistically significant at 2.5%.
***Statistically significant at 10%.

Government aid to rubber beginning in 1956 designed to increase production through replanting has apparently not been too effective. The impact has apparently been positive but small in size. The farmers frequently must wait several years after applying for help as funds have not been adequate to meet the demand. A lot of the money, moreover, never reaches the farmer but goes to overhead and mismanagement. Lastly, it takes seven years after

planting before any production occurs, and since sizeable funds have only been provided since the mid 60's, it may be too early yet to know what the impact is going to be.

There was a sizeable increase in the amount of area planted in 1966 and 1967 from 2.8 million rai in 1965 to 3.9 million rai in 1967 so that total rubber production should be up in the seventies. There is little or no guidance that yield per rai is going to change, however, under existing programs. Thai rubber farmers are still using traditional methods. If no government programs are developed to change this, the future of Thai rubber in international market may be jeopardized. Professor Silcock has stated:

> In south Thailand, though Chinese merchants were trying to stimulate rubber growing, there was no visible example of large profits and rubber is a crop requiring a seven-year investment. Thai small planters planted more during the whole decade than small planters in Malaya; but of course Malaya by this time had a substantial lead.[2]

The correlation matrix is found in Table 35.

Table 35. Correlation coefficients of variables--rubber

Yield	A_t	R_t	G_t	
1.000	.051	.088	-.524	Yield
	1.000	.948	-.014	A_t
		1.000	0.041	R_t
			1.000	G_t

Source: Calculated by the author.

[2] T. H. Silcock, The Economic Development of Thai Agriculture (New York: Cornell University Press, 1970), p. 49.

Maize

In the last decade there has been no direct aid by the government to crops other than rice and rubber. There has been some indirect aid through infrastructure improvements, and the like. A dummy variable was introduced in a rough attempt to see if these indirect activities had any impact. The weakness of this vague explanatory variable is recognized, but, nevertheless, it did provide some insight in the case of maize.

During the last decade, maize appears to have profited from these indirect government expenditures as shown by the dummy variable in the model in Table 36. It is true that no direct aid was made available to maize producers but the government did build the Friendship Highway across the country and a new rail track in the central part of Thailand and maize is grown extensively beside these arteries. Over 75 percent of maize production today is cultivated along the Friendship Highway in the central region. This new land opened up has appeared to bring an overall higher yield since the sign associated with the dummy variable and the area planted is positive. This is also a drier region so that additional rain has a positive impact on yields. In the future, since most of the new lands along the road and the tracks have been cultivated, more direct assistance will in all likelihood be needed if further improvements are to be made.

Table 37 presents the correlation coefficients.

Table 36. Estimated regression coefficients of maize (1948-1967)

Step Number	R^2	F-Ratio	Explanatory variables			
			Intercept	A_t	R_t	D_t
	Regression variables on yield					
1	.734	49.76*	185.00005			123.99989
						(17.57784)
2	.742	24.47*	113.39917		.04779	122.12790
					(.06642)	(18.00708)
3	.743	15.45*	112.64282	.00395	.04716	112.57899
				(.01486)	(.06836)	(40.43277)

*Statistically significant at 0.1%.

Table 37. Correlation coefficients of all variables--maize

Yield	A_t	R_t	D_t	
1.000	.780	.211	.857	Yield
	1.000	.144	.891	A_t
		1.000	1.44	R_t
			1.000	D_t

Source: Calculated by the author.

Other Crops

Similar regressions were performed for several other major crops, including kenaf and jute, and cassava, which are traditional crops and for cotton and ground nuts, which are relatively new in Thailand. The results were not statistically significant. Nothing major has been done to influence yields of any of these crops.

A regression of these same variables on output instead of yield indicated, not surprisingly, that the area planted was the major determinant of output.[3]

Cassava, for instance, is a crop whose output has been growing at 30 percent a year, almost all of it which can be attributed to expanding acreage.

Our results indicate that the policy of the Thai government plan as set forth by the National Economic Development Board (NEDB) that:

> Research and experimentation in new agricultural techniques were conducted in order to bring about reforms in production methods, increase productivity, improve the quality of yields, stimulate the production of new and improved crops and more extensive breeding of animals. Research and experimentation are important if Thailand is to succeed in producing enough for her rapidly increasing population, and to be able to compete with other nations in the world market for primary products. . . . Agricultural research will be improved and expanded so as to modernize farm techniques and to increase farm efficiency,[4]

is still a matter largely of words.

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[3] The results of these runs can be found in Appendix II.

[4] National Economic Development Board, Performance Evaluation of Development in Thailand for 1965 (Bangkok, Thailand: Government House Printing Office, 1966), pp. 48-50.

It is still largely true, as Professor Gunnar Myrdal pointed out, that:

> Generally, the increase recorded in agricultural production in South Asia in recent decades has been due more to an expansion of the cultivated area than to a rise in yields per acre. There seems, however, to be rather general agreement among agricultural planners that "Scope for expanding the culrivated area is now very limited in most ECAFE countries.[5]

If new lands are now largely opened up, then perhaps it is time for the government to become more involved in agricultural research, and development. The lack of credit is a serious problem for Thai farmers and that money which is available is extremely expensive. Table 38 indicates the various rates throughout the country. The average rate is 2.4 percent per month which is high when compared with the rate of output and value of agricultural products. However, despite the high interest rate, there is very little available to the farmer.

All developing countries need to alter their traditional agricultural systems. Government assistance for this in Thailand has only started in the 1960's and is still in its beginning stages.

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[5] Gunnar Myrdal, Asian Drama, Vol. II (New York: The Twentieth Century Fund, 1968), p. 1261.

Table 38. Interest rate of agricultural credits

Region	Average Rate	Rate of interest per month 0.0-0.9	1.0-1.9	2.0-2.9	3.0-3.9	4.0-4.9	5.0-5.9	10.0-10.0	Total
Central	2.2	30.1	15.6	28.1	8.3	6.5	9.4	2.2	100%
Northern	3.3	39.7	9.5	4.3	15.5	13.8	13.8	3.4	100%
North-eastern	2.7	56.8	2.4	8.8	3.2	2.4	17.6	8.8	100%
Southern	1.5	63.6	12.9	6.8	5.3	0.8	7.8	3.0	100%

Source: NEDB, Agricultural Development Strategy for Thailand (Bankgok, Thailand: Mimeographed, 1969), p. 88.

CHAPTER VII

CONCLUSIONS

The results indicate that direct government programs have had a positive influence in both rice and rubber production, though the impact on rubber yields to the present has not been very great. Also there is some indication that the building of transportation arteries has a positive impact on maize production.

As pointed out earlier, the government allocated 13.9 percent of overall expenditures to agriculture in the First National Economic Development Plan (1961-1966) and 19.8 percent in the Second National Economic Development Plan (1967-1971). These expenditures include general administrative expenses as the main item. Only rice and rubber benefited from these expenditures. Government sources indicate that the Third National Economic Development Plan (1972-1976) will concentrate more on the agriculture sector than the last two plans have.[1] It would be hoped that there would be enough funds available to diversify government aid by extending it to more crops. There is, at the present time, little diversity in Thai agriculture. How effective this help would be in improving Thai agriculture and the lot of the peasant remains to be seen. It is true as Professor Gunnar Myrdal states that:

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[1]Secretary of NEDB, Investor (December, 1970), p. 1350.

Industrialization is questionably of crucial importance for long range development, but the more immediate problem in the South Asian countries is agriculture.[2]

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[2]Gunnar Myrdal, Asian Drama, Vol. I (New York: The Twentieth Century Fund, 1968), p. 696.

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APPENDIXES

Appendix I: Abbreviations and List of Variables

Abbreviations

Baht = Thai currency. 20.80 baht equals $1.00 in U.S.

FY = Fiscal Year (October 1 to September 30)

Kwien = 2 cubic meters

NEDB = National Economic Development Board

Rai = 0.4 acre or 0.16 hectare

R^2 = Coefficient of determination

List of variables

Y = Output: measured in metric tons per annum

Y_d = Average yield: measured in kilogram per rai

A_t = Area planted: measured in rai

R_t = Average annual rainfall: measured in m.m.

G_t = Accumulated government research expenditures in real term: measured in million baht

D_t = Dummy variable. $D_t = 0$ for the years before 1960 and $D_t = 1$ for 1960 onward

Appendix II: Regression Coefficients and Correlation Matrix

Table 39. Estimated regression coefficients of kenaf and jute (1950-1967

Step Number	R^2	F-Ratio	Explanatory variables			
			Intercept	A_t	R_t	D_t
	Regression variables on output					
Kenaf:						
1	.935	232.780*	-2209.56250	.19960		
				(.01308)		
2	.936	110.213*	-658.36328	.20760		-18045.03516
				(.02519)		(48029.13672)
Jute:						
1	.958	362.573*	114.88672	.17956		
				(.00943)		
2	.966	212.892*	355.58681	.15073		1181.33398
				(.01748)		(620.09766)
3	.970	150.180*	3028.91870	.16039	-2.05610	1121.15088
				(.01848)	(1.52898)	(605.69067)

*Statistically significant at 0.1%.

Table 40. Correlation coefficient of all variables--kenaf and jute

Kenaf				
Output	A_t	R_t	D_t	
1.000	.967	.446	.805	Output
	1.000	.464	.846	A_t
		1.000	.473	R_t
			1.000	D_t
Jute				
1.000	.979	.512	.893	Output
	1.000	.581	.866	A_t
		1.000	.473	R_t
			1.000	D_t

Source: Calculated by the author.

Table 41. Estimated regression coefficients of cassava (1957-1967)

Step Number	R^2	F-Ratio	Explanatory variables			
			Intercept	A_t	R_t	D_t
	Regression variables on output					
1	.945	154.276*	-64.00562	2.54619 (.20499)		
2	.957	89.853*	-1377.47119	2.34637 (.23145)	.94209 (.61500)	
3	.958	53.144*	-1437.07520	2.46981 (.47303)	.95969 (.65566)	-64.87488 (212.39926)

*Statistically significant at .1%.

Table 42. Correlation coefficients of all variables--cassava

Y: Output	A_t	R_t	D_t	
1.000	.972	.640	.867	Y:Output
	1.000	.564	.898	A_t
		1.000	.538	R_t
			1.000	D_t

Source: Calculated by the author.

Table 43. Estimated regression coefficients of cotton (1948-1967)

Step Number	R^2	F-Ratio	Explanatory variables			
			Intercept	A_t	R_t	D_t
Regression variables on yield						
1	.334	9.011*	85.57811	.10814 (.03602)		
2	.352	4.626**	77.13451	.15005 (.06990)		-11.41805 (16.23589)
3	.376	3.218***	38.67348	.15381 (.07088)	.02509 (.03208)	-13.14589 (16.5737)

*Statistically significant at 1%.
**Statistically significant at 2.5%.
***Statistically significant at 10%.

Table 44. Correlation coefficients of all variables--cotton

Yield	A_t	R_t	D_t	
1.000	.578	.185	.421	Yield
	1.000	.088	.852	A_t
		1.000	.144	R_t
			1.000	D_t

Source: Calculated by the author.

Table 45. Estimated regression coefficients of ground nuts (1948-1967)

Step Number	R^2	F-Ratio	Explanatory variables			
			Intercept	A_t	R_t	D_t
	Regression variables on yield					
1	.603	27.34*	167.22221			44.32326
						(8.47672)
2	.673	17.55*	136.12015	.07161		30.91072
				(.03732)		(10.55446)
3	.674	11.03*	124.57959	.07136	.00730	31.50711
				(.03849)	(.05155)	(11.66034)

*Statistically significant at 0.1%.

Table 46. Correlation coefficients of all variables--ground nuts

Yield	A_t	R_t	D_t	
1.000	.713	-.304	.777	Yield
	1.000	-.253	.662	A_t
		1.000	-.429	R_t
			1.000	D_t

Source: Calculated by the author.

Appendix III. Data for Regression

Table 47. Data for regression--rice

Year	Y_d	A_t '000 rai	R_t	G_t
1938	247	21062	0	0
1939	231	21919	0	0
1940	237	21649	0	0
1941	243	23794	0	0
1942	225	24808	0	0
1943	214	27370	0	0
1944	232	25924	0	0
1945	207	25387	0	0
1946	201	23514	0	0
1947	203	24887	0	0
1948	205	20156	1566	0
1949	222	32573	1597	0
1950	215	32926	1589	0
1951	205	34625	1650	0
1952	204	37245	1580	0
1953	206	33551	1684	0
1954	222	38575	1445	0
1955	202	43732	1555	0
1956	218	36060	1705	0
1957	230	37648	1390	0
1958	208	31717	1399	0
1959	218	35987	1569	0
1960	206	37909	1492	0
1961	222	37008	1625	12
1962	231	38619	1545	35
1963	240	41618	1452	61
1964	253	41256	1528	91
1965	256	40872	1537	126
1966	249	40491	1524	165
1967	276	46096	1676	228
1968	274	40064	1673	296
1969	275	44681	1702	372

Sources: Agricultural Statistics of Thailand, 1967 (Bangkok, Thailand: Office of the Under Secretary of State, 1970).
NEDB, The Second National Economic and Social Development Plan (1967-1971) (Bangkok, Thailand: Government House Printing Office, 1968).

Table 48. Data for regression--rubber and maize

Year	Rubber				Maize		
	Y_d	A_t '000 rai	R_t	G_t	Y_d	A_t '000 rai	R_t
1948	70	1366	1997	000	130	0132	1515
1949	65	1486	2130	000	127	0202	1573
1950	70	1629	2128	000	127	0211	1256
1951	66	1678	2193	000	163	0256	1368
1952	59	1693	2129	000	165	0271	1246
1953	56	1755	2450	000	173	0295	1776
1954	65	1831	1956	000	191	0326	1509
1955	70	1918	2224	000	196	0345	1671
1956	68	2011	2211	005	225	0510	1705
1957	67	2106	1504	010	229	0597	1390
1958	68	2203	1594	015	238	0783	1399
1959	70	2302	2087	020	256	1241	1569
1960	72	2400	1859	025	306	1779	1492
1961	74	2501	1994	033	321	1863	1625
1962	75	2597	1869	044	331	2009	1545
1963	74	2688	1619	061	353	2428	1452
1964	76	2772	1784	077	276	3384	1528
1965	76	2853	1873	094	291	3510	1572
1966	66	3330	2550	112	304	3689	1594
1967	55	3970	2220	128	290	4185	1490

Sources: Agricultural Statistics of Thailand, 1967 (Bangkok, Thailand: Office of the Under Secretary of State, 1970).

NEDB, The Second National Economic and Social Development Plan (1967-1971) (Bangkok, Thailand: Government House Printing Office, 1968).

Table 49. Data for regression--jute and kenaf

Year	Jute			Kenaf	
	Y	A_t	R_t	Y	A_t
1950	02500	17000	1460	004700	0030000
1951	03000	21000	1555	020000	0085000
1952	01000	07000	1443	013100	0066000
1953	01800	10000	1372	014000	0060000
1954	01300	08000	1217	008200	0036000
1955	01300	10000	1182	009800	0052000
1956	02500	14000	1445	017000	0108000
1957	02800	12000	1258	017800	0078000
1958	02900	13000	1308	029600	0127000
1959	03900	17000	1368	050000	0277000
1960	06200	26000	1451	181300	1870000
1961	11600	63000	1432	239300	1186000
1962	06700	44000	1632	134000	0700000
1963	06900	33000	1383	211700	1950000
1964	06500	32000	1429	303100	1346000
1965	08700	48000	1390	528600	2331000
1966	10900	60000	1650	661400	3110000
1967	07400	43000	1440	421400	2141000

Sources: Agricultural Statistics of Thailand, 1967 (Bangkok, Thailand: Office of the Under Secretary of State, 1970).
NEDB, The Second National Economic and Social Development Plan (1967-1971) (Bangkok, Thailand: Government House Printing Office, 1968).

Table 50. Data for regression--cassava

Year	Y '000 tons	A_t '000 rai	R_t (m. m.)
1957	418	240	1390
1958	487	276	1399
1959	1083	391	1569
1960	1222	447	1492
1961	1726	621	1625
1962	2077	767	1545
1963	2111	875	1452
1964	1557	656	1528
1965	1475	637	1537
1966	1892	814	1524
1967	2063	880	1676

Sources: Agricultural Statistics of Thailand, 1967 (Bangkok, Thailand: Office of the Under Secretary of State, 1970).
NEDB, The Second National Economic and Social Development Plan (1967-1971) (Bangkok, Thailand: Government House Printing Office, 1968).

Table 51. Data for regression--cotton and ground nuts

Year	Cotton			Ground nuts		
	Y_d	A_t '000 rai	R_t	Y_d	A_t '000 rai	R_t
1948	087	185	1515	137	218	1566
1949	087	176	1573	126	440	1597
1950	092	220	1256	144	434	1589
1951	103	249	1368	172	441	1650
1952	104	229	1246	173	441	1580
1953	101	252	1776	173	451	1684
1954	107	213	1509	187	491	1445
1955	125	200	1671	193	487	1555
1956	132	244	1705	200	506	1705
1957	142	256	1390	200	591	1390
1958	137	253	1399	201	602	1399
1959	125	298	1569	202	613	1569
1960	133	343	1492	210	725	1492
1961	116	330	1625	209	516	1625
1962	116	361	1545	211	533	1545
1963	112	435	1452	221	511	1452
1964	119	413	1528	222	541	1528
1965	132	453	1572	219	596	1537
1966	179	495	1594	230	957	1524
1967	134	604	1490	202	653	1676

Sources: Agricultural Statistics of Thailand, 1967 (Bangkok, Thailand: Office of the Under Secretary of State, 1970).
NEDB, The Second National Economic and Social Development Plan (1967-1971) (Bangkok, Thailand: Government House Printing Office, 1968).

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