

## CHAPTER 6

## CROP PRODUCTION

## Crop Production in the Study Area

Refer to Tables 40 - 53

Refer to Figs. 34 - 63

There are many kinds of crops grown in the study area, but the two main crops, displaying significant effects on the economy of the area, are cassava and sugar cane. Rice and peanuts are also grown in the area of study, but only in small amounts, although there is substantial production of these crops in the whole area of Changwads Rayong and Chonburi. The present analysis is chiefly concerned with the two main crops -- cassava and sugar cane -- but data on the cultivated area, average yield, and production of rice and peanuts are also shown in the tables. Figs. 34 and 35 show views of the production of the two main crops in the study area: cassava and sugar cane, respectively.

Average Yield and Production of Cassava in the Study Changwads:  
Rayong and Chonburi

Refer to Tables 40 and 41

Refer to Figs. 36 through 39, incl.



Fig. 34- Cassava Plantation



Fig. 35- Harvesting Sugar Cane

The average yield of cassava in Changwad Rayong seemed not to vary significantly in the period from 1969 through 1974; typically, it remained at close to the arithmetic mean of 2,890 kg/rai. In Changwad Chonburi, the average yield in 1971 was considerably higher than in the other years. After 1971, the yield per rai dropped until 1975. The average yield of cassava in Changwad Chonburi during the study period was 2,380 kg/rai. It may be seen that the growth of total production of cassava in Changwad Rayong has been very significant. In the five-year period from 1970 to 1975, the production of cassava grew by more than four times. In contrast, the increase in Changwad Chonburi was only about 13 percent.

Comparison of Cassava Production for the Whole Kingdom, Seven Eastern Changwads, Changwad Rayong, Changwad Chonburi, Two Study Amphoes in Changwad Rayong, and Study Amphoe Sri Racha in Changwad Chonburi

Refer to Table 42, 43 and 44

Refer to Figs. 40 through 45, incl.

The growth index of cassava production from 1969 to 1974 for the whole Kingdom is higher than that for the seven Eastern changwads; this means that cassava production in

other parts of Thailand had increased more rapidly than the production of the seven Eastern changwads. Viewed another way, the cassava production of the seven Eastern changwads in 1969 represented 73 percent of the production of the whole Kingdom. By 1974, this fraction had fallen to but 49 percent of the total national production. Of the two study changwads in the seven Eastern changwads, it is noted that in 1969, production in Changwad Chonburi was about 76 percent of the total production of the seven Eastern changwads, while the production in Changwad Rayong was only about 8 percent. By 1974, the production in Changwad Rayong had increased to the point of its producing about 38 percent of the total production of the seven Eastern changwads. In the same year, the production in Changwad Chonburi was only 33 percent of the total production.

In studying the production of the two amphoes in Changwad Rayong which are influenced by the study feeder road, it is seen that the production of these two amphoes increased much more than the production of Changwad Rayong less these two amphoes. In Amphoe Sri Racha, the only one amphoe in Changwad Chonburi affected by the study feeder road, the cassava production seems not to have varied from the base year 1969. Also, the production of Changwad Chonburi or of Changwad Chonburi less Amphoe Sri Racha did not change much in the study period.

Average Yield and Production of Sugar Cane in the Study  
Changwads: Rayong and Chonburi

Refer to Tables 45 and 46

Refer to Figs. 46 through 49, incl.

It may be seen that the average yield of sugar cane in Changwad Chonburi (7,600 kg/rai) is substantially higher than in Changwad Rayong (5,410 kg/rai), but the growth index for Changwad Rayong (excluding the production in 1969) is very much higher than of Changwad Chonburi. The production of sugar cane in Changwad Rayong in 1974 was about 13 times that in 1970. However, the production of sugar cane in Changwad Chonburi in the period from 1969 to 1975 merely doubled.

Comparison of Sugar Cane Production for the Whole Kingdom, Seven Eastern Changwads, Changwad Rayong, Changwad Chonburi, Two Study Amphoes in Changwad Rayong, and Study Amphoe Sri Racha in Changwad Chonburi .

Refer to Tables 47, 48, and 49

Refer to Figs. 50 through 55, incl.

The rate of increase of sugar cane production in the whole Kingdom from 1969 to 1974 was higher than the growth

rate in the seven Eastern Changwads.

Comparing the production in Changwad Rayong with that of the group of seven Eastern changwads it may be seen that in the four-year period from 1970 to 1974, Changwad Rayong's fraction of the sugar cane production in the seven Eastern changwads rose from 2 percent (1970) to 24 percent (1974). From Tables 46 and 47, it can be seen that in 1969 Changwad Chonburi produced 99 percent of the total production of seven Eastern changwads. In 1974, this changwad was still producing about 75 percent of the total seven Eastern changwads' production. Although there has been a great change in the amount of sugar cane produced in Changwad Rayong, Changwad Chonburi doubtless dominates the scene. Production in the two amphoes affected by the Ban Khai-Ban Bung feeder road -- Amphoe Ban Khai and King Amphoe Pluak Daeng -- increased eight-fold in the three-year period from 1971 to 1974. Meanwhile, the production of Changwad Rayong less these two amphoes increased about  $1\frac{1}{2}$  times.

In Amphoe Sri Racha, there was no increase in sugar cane production from 1970 to 1975, the production remained constant at about 650,000 MT per year. In Changwad Chonburi less Amphoe Sri Racha, production increased about  $1\frac{1}{2}$  times.

### Minor Crops in the Study Area

The dominant role of cassava and sugar cane as the major crops in the study area has been set forth in preceding paragraphs. In the farm interviews conducted for the present research it was found that only one family cultivated rice on a significant area of their land, and only one other family grew peanuts in commercial quantities.

However, to place the production of rice and peanuts in Changwads Rayong and Chonburi in proper perspective with respect to the major crops, data on these two minor crops were gathered and studied. Tables 50 and 51 show the characteristics of rice production in Changwads Rayong and Chonburi, respectively. Similarly, Tables 52 and 53 present pertinent data regarding peanut production in these two Changwads. The numerical data described above are presented graphically in Figs. 56 through 63, inclusive.

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Table 40 - Cassava: Cultivated Area (rai), Harvested Area (rai), Damaged Area (rai), Production (MT) and Average Yield (kg/rai) in Changwad Rayong

Year	Cultivated Area rai	Harvested Area rai	Damaged Area rai	Production MT**	Production Index	Avg. Yield* kg/rai	Yield Index
1969	52,800	52,800	-	147,840	-	2,800	1.00
1970	150,374	150,374	-	481,196	1.00	3,200	1.14
1971	311,778	311,778	-	1,013,279	2.11	3,250	1.16
1972	349,288	349,288	-	1,012,935	2.11	2,900	1.04
1973	591,765	591,752	13	1,754,545	3.65	2,965	1.06
1974	609,454	607,441	2,013	1,745,785	3.63	2,874	1.03
1975	N.A.	N.A.	N.A.	2,134,913	4.44	N.A.	N.A.

Source: Agricultural Extension Department

\* Avg. Yield =  $\frac{\text{Production}}{\text{Harvested area}}$

\*\* MT = Metric ton = 1000 kg

N.A. = Not available

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Table 41 - Cassava: Cultivated Area (rai), Harvested Area (rai), Damaged Area (rai), Production (MT), and Average Yield (kg/rai), in Changwad Chonburi

Year	Cultivated Area rai	Harvested Area rai	Damaged Area rai	Production MT	Production Index	Avg. Yield kg/rai	Yield Index
1969	543,060	542,800	260	1,357,000	1.00	2,500	1.00
1970	482,953	482,953	-	1,219,942	0.90	2,526	1.01
1971	291,142	291,142	-	1,120,897	0.83	3,850	1.54
1972	526,179	526,179	-	1,195,735	0.88	2,273	0.91
1973	643,310	643,074	236	1,348,528	0.99	2,097	0.84
1974	659,532	652,005	7,527	1,510,044	1.11	2,316	0.93
1975	750,371	750,371	-	1,530,757	1.13	2,040	0.82

Source: Agricultural Extension Department

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Table 42 - Production of Cassava (MT) of the Whole Kingdom and the Seven Eastern Changwads

Year	Whole Kingdom	Index	Seven Eastern Changwads	Index
1969	2,474,260	1.00	1,794,254	1.00
1970	2,431,611	0.98	1,721,693	0.96
1971	3,673,168	1.48	2,701,238	1.51
1972	4,435,964	1.79	2,582,298	1.44
1973	7,768,325	3.14	4,162,040	2.32
1974	9,504,014	3.84	4,638,433	2.59
1975	N.A.	-	N.A.	-

Source: Agricultural Extension Department

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Table 43 - Production of Cassava (MT) in Changwad Rayong

Year	Changwad Rayong	Two Amphoes*	Index	Changwad Rayong Less two Amphoes	Index
1969	147,840**	280,000**	1.00	-	-
1970	481,196	420,000	1.50	61,196	-
1971	1,013,279	420,000	1.50	593,279	1.00
1972	1,012,935	453,870	1.62	559,065	0.94
1973	1,754,545	1,389,270	4.96	365,275	0.62
1974	1,745,785	998,950	3.57	746,835	1.26
1975	2,134,913	N.A.	-	-	-

\* Amphoe Ban Khai and King Amphoe Pluak Daeng

\*\* Unreasonable figures: The production from two amphoes is greater than that of the whole changwad.

Source: Agricultural Extension Department

Table 44 - Production of Cassava (MT) in Changwad Chonburi

Year	Changwad Chonburi	Amphoe Sri Racha	Index	Changwad Chonburi Less A. Sri Racha	Index
1969	1,357,000	168,120	1.00	1,188,880	1.00
1970	1,219,942	167,910	0.99	1,052,032	0.88
1971	1,120,897	172,790	1.03	948,107	0.80
1972	1,195,735	179,730	1.07	1,016,005	0.85
1973	1,348,528	179,730	1.07	1,168,798	0.98
1974	1,510,044	179,730	1.07	1,330,314	1.12
1975	1,530,757	N.A.	-	-	-

Source: Agricultural Extension Department

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Table 45 - Sugar Cane: Cultivated Area (rai), Harvested Area (rai), Damaged Area (rai), Production (MT), and Average Yield (kg/rai) in Changwad Rayong

Year	Cultivated Area rai	Harvested Area rai	Damaged Area rai	Production MT	Production Index	Avg. Yield kg/rai	Yield Index
1969	5,000	5,000	-	6,000	-	1,200	-
1970	13,226	13,226	-	52,904	1.00	4,000	1.00
1971	48,693	48,693	-	243,465	4.60	5,000	1.25
1972	55,282	55,282	-	304,051	5.75	5,500	1.38
1973	118,601	118,291	310	730,210	13.80	6,173	1.54
1974	139,070	138,950	120	699,196	13.22	5,032	1.26
1975	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.

Source: Agricultural Extension Department

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Table 46 - Sugar Cane: Cultivated Area (rai), Harvested Area (rai); Damaged Area (rai), Production (MT), and Average Yield (kg/rai) in Changwad Chonburi

Year	Cultivated Area rai	Harvested Area rai	Damaged Area rai	Production MT	Production Index	Avg. Yield kg/rai	Yield Index
1969	204,795	204,500	295	1,431,500	1.00	7,000	1.00
1970	276,895	276,895	-	2,250,142	1.57	8,126	1.16
1971	278,422	278,422	-	2,283,058	1.59	8,200	1.17
1972	271,911	271,911	-	2,150,232	1.50	7,908	1.13
1973	359,353	359,045	308	2,876,310	2.01	8,011	1.14
1974	327,455	327,455	-	2,168,407	1.51	6,622	0.95
1975	442,633	442,633	-	3,276,812	2.29	7,403	1.06

Source: Agricultural Extension Department



Table 47 - Production of Sugar Cane (MT) of the Whole Kingdom and the Seven Eastern Changwads

Year	Whole Kingdom	Index	Seven Eastern Changwads	Index
1969	4,876,389	1.00	1,445,115	1.00
1970	5,617,785	1.15	2,310,911	1.60
1971	5,920,082	1.21	3,198,174	2.21
1972	8,560,064	1.76	2,485,086	1.72
1973	14,173,239	2.91	3,633,087	2.51
1974	15,820,325	3.24	2,906,575	2.01
1975	N.A.	-	N.A.	-

Source: Agricultural Extension Department

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Table 48 - Production of Sugar Cane (MT) in Changwad Rayong

Year	Changwad Rayong	Two Amphoes*	Index	Changwad Less Two Amphoes	Index
1969	6,000**	40,000**	-	-	-
1970	52,904	41,600	-	11,304	-
1971	243,465	48,000	1.00	195,465	1.00
1972	304,051	88,120	1.84	215,931	1.10
1973	730,210	396,140	8.25	334,070	1.71
1974	699,196	413,430	8.61	285,766	1.46
1975	N.A.	N.A.	-	-	-

\* Amphoe Ban Khai and King Amphoe Pluak Daeng

\*\* Unreasonable figures: the production from two amphoes is greater than that of the whole changwad.

Source: Agricultural Extension Department



Table 49 - Production of Sugar Cane (MT) in Changwad Chonburi

Year	Changwad Chonburi	Amphoe Sri Racha	Index	Changwad Chonburi Less Amphoe Sri Racha	Index
1969	1,431,500	N.A.	-	-	-
1970	2,250,142	667,930	1.00	1,582,212	1.00
1971	2,283,058	642,150	0.96	1,640,908	1.04
1972	2,150,232	667,930	1.00	1,482,302	0.94
1973	2,876,310	656,910	0.98	2,218,400	1.40
1974	2,168,407	650,430	0.97	1,517,977	0.96
1975	3,276,812	657,720	0.98	2,619,092	1.66

Source: Agricultural Extension Department

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Table 50 - Rice: Cultivated Area (rai), Harvested Area (rai), Damaged Area (rai), Production (MT), and Average Yield (kg/rai) in Changwad Rayong

Year	Cultivated Area rai	Harvested Area rai	Damaged Area rai	Production MT	Production Index	Avg. Yield kg/rai	Yield Index
1969	-	-	-	-	-	-	-
1970	3,216	3,216	-	965	1.00	300	1.00
1971	4,930	4,930	-	1,479	1.53	300	1.00
1972	5,330	5,330	-	1,599	1.66	300	1.00
1973	5,713	5,708	5	1,467	1.52	257	0.86
1974	7,087	7,087	-	2,119	2.20	299	1.00
1975	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.

Source: Agricultural Extension Department

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จุฬาลงกรณ์มหาวิทยาลัย

Table 51 - Rice: Cultivated Area (rai), Harvested Area (rai), Damaged Area (rai), Production (MT), and Average Yield (kg/rai) in Changwad Chonburi

Year	Cultivated Area rai	Harvested Area rai	Damaged Area rai	Production MT	Production Index	Avg. Yield kg/rai	Yield Index
1969	300	300	-	30	1.00	100	1.00
1970	480	480	-	117	3.90	243	2.43
1971	720	720	-	144	4.80	200	2.00
1972	668	668	-	150	5.00	225	2.25
1973	317	317	-	73	2.43	231	2.31
1974	760	760	-	152	5.07	200	2.00
1975	482	482	-	113	3.77	236	2.36

Source: Agricultural Extension Department

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จุฬาลงกรณ์มหาวิทยาลัย

Table 52 - Peanuts: Cultivated Area (rai), Harvested Area (rai), Damaged Area (rai), Production (MT), and Average Yield (kg/rai), in Changwad Royong

Year	Cultivated Area rai	Harvested Area rai	Damaged Area rai	Production MT	Production Index	Avg. Yield kg/rai	Yield Index
1969	6,514	6,514	-	1,776,250	1.00	273	1.00
1970	6,848	6,848	-	6,848,000?	3.86	1,000?	3.66
1971	8,432	8,432	-	2,065,840	1.16	245	0.90
1972	8,226	8,226	-	1,891,980	1.07	230	0.84
1973	11,975	11,967	8	2,513,070	1.41	210	0.77
1974	12,122	11,942	180	2,830,254	1.59	237	0.87
1975	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.

Source: Agricultural Extension Department

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Table 53 - Peanuts: Cultivated Area (rai), Harvested Area (rai), Damaged Area (rai), Production (MT), and Average Yield (kg/rai) in Changwad Chonburi

Year	Cultivated Area rai	Harvested Area rai	Damaged Area rai	Production MT	Production Index	Avg. Yield kg/rai	Yield Index
1969	35,000	35,000	-	7,000,000	1.00	200	1.00
1970	58,461	58,461	-	14,998,580	2.14	257	1.29
1971	17,628	17,628	-	3,666,624	0.52	208	1.04
1972	15,006	15,006	-	3,294,450	0.47	220	1.10
1973	54,560	54,539	21	15,652,693	2.24	287	1.44
1974	51,505	49,960	1,545	13,739,000	1.96	275	1.38
1975	52,508	51,994	514	8,111,064	1.16	156	0.78

Source: Agricultural Extension Department

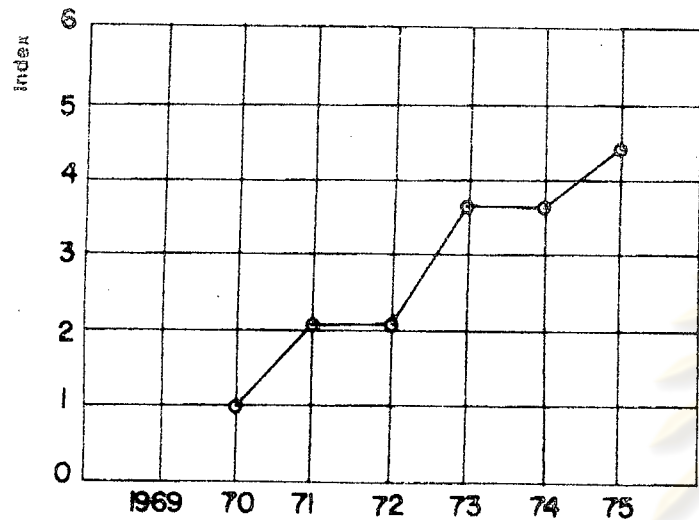


Fig. 36 — Cassava Production : Changwad Rayong

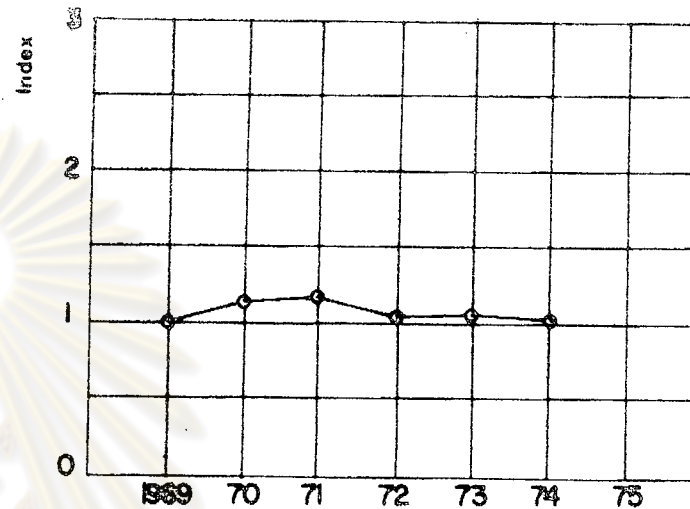


Fig. 37 — Average Yield of Cassava :  
Changwad Rayong

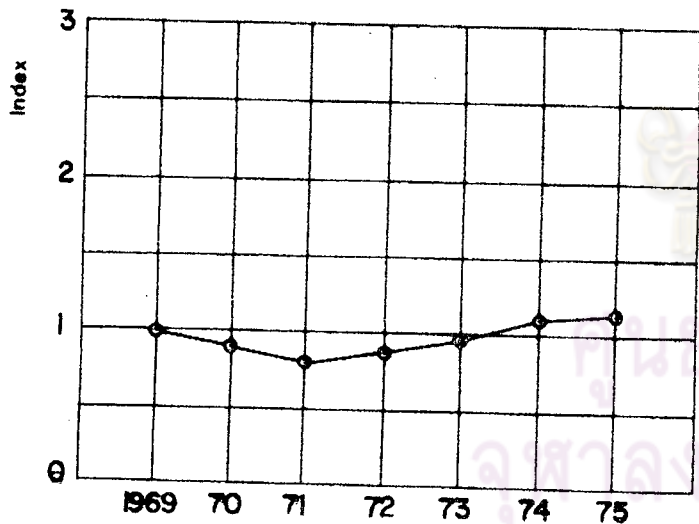


Fig. 38 — Cassava Production : Changwad Chonburi

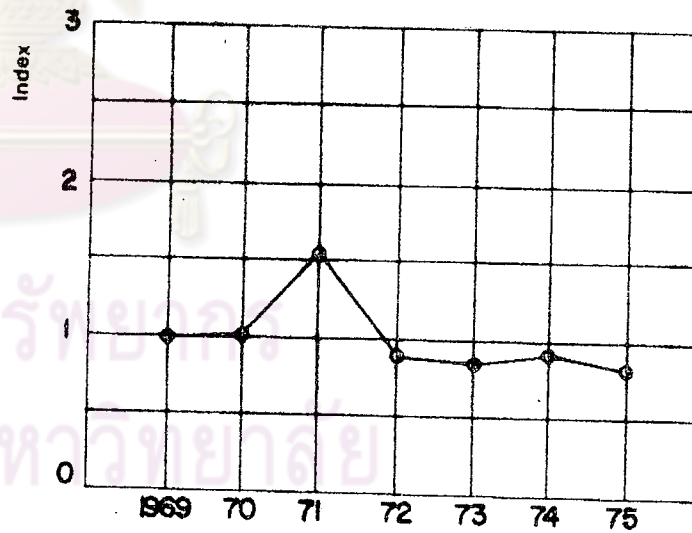


Fig. 39 — Average Yield of Cassava :  
Changwad Chonburi

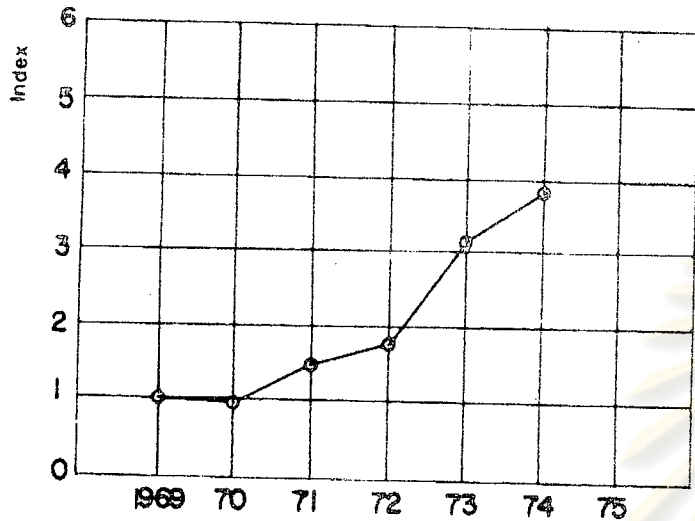


Fig. 40 - Cassava Production: Whole Kingdom

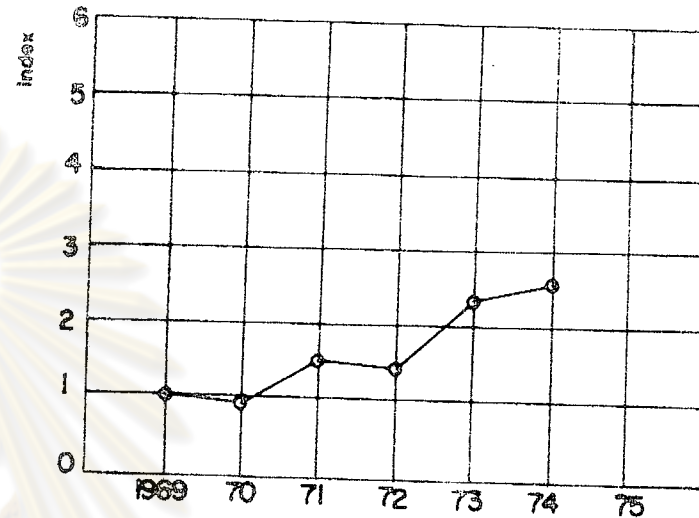


Fig. 41 - Cassava Production:

Seven Eastern Changwads

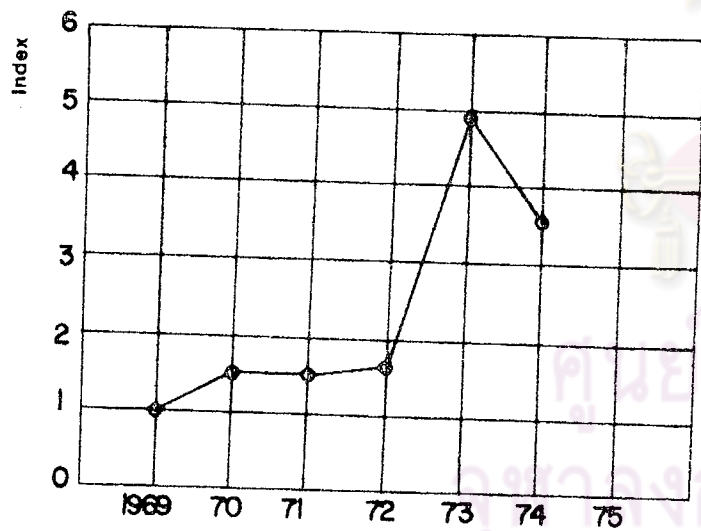


Fig. 42 - Cassava Production: Two Amphoes in Changwad Rayong,

A. Ban Khai and King A. Pluak Daeng

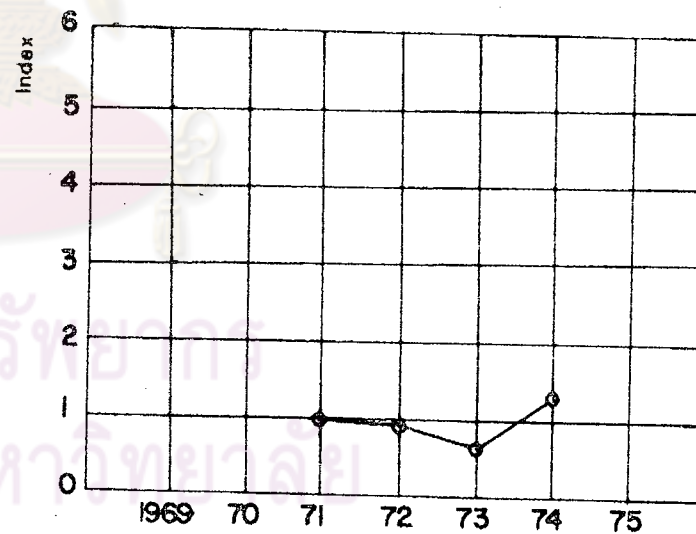


Fig. 43 - Cassava Production:

Changwad Rayong Less Two Amphoes

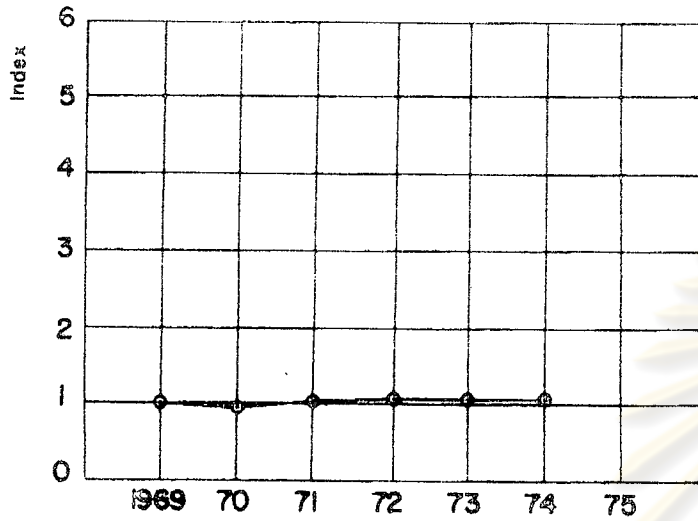


Fig. 44 - Cassava Production : Amphoe Sri Racha  
in Changwad Rayong

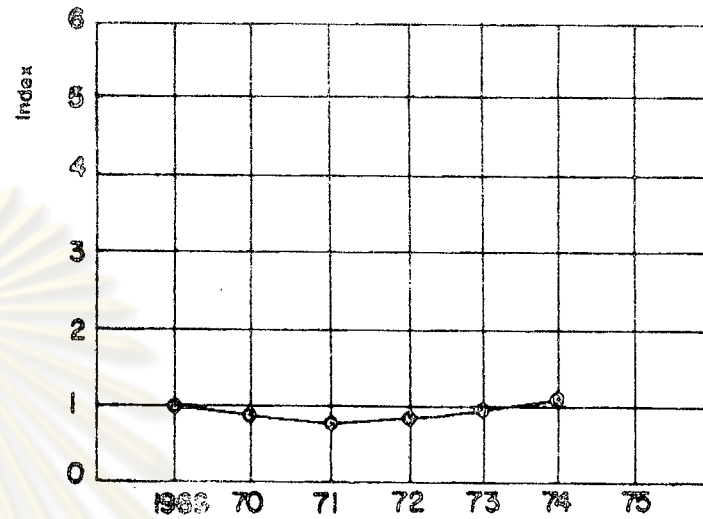


Fig. 45 - Cassava Production  
Changwad Chonburi Less A. Sri Racha

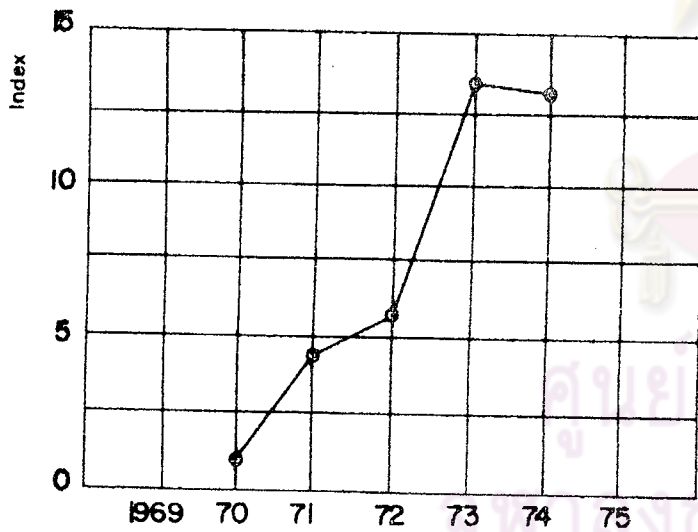


Fig. 46 - Sugar Cane Production :  
Changwad Rayong

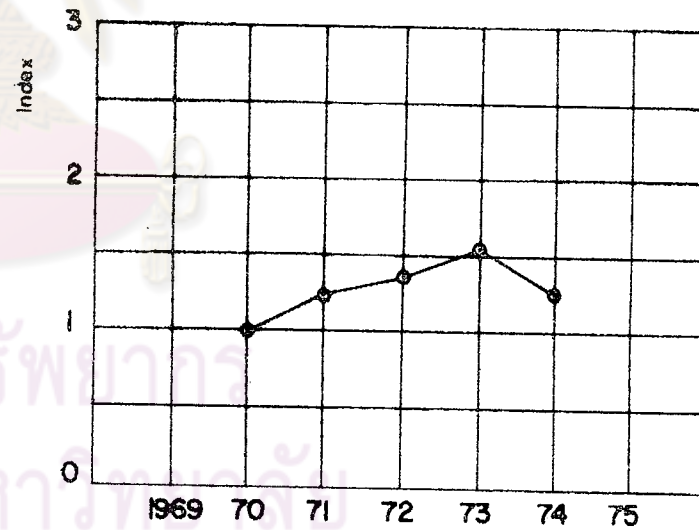


Fig. 47 - Average Yield of Sugar Cane :  
Changwad Rayong



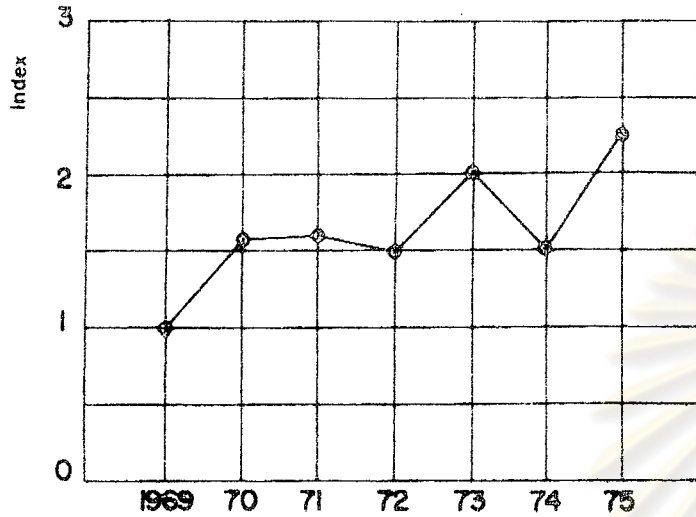


Fig. 48 - Sugar Cane Production :  
Changwad Chonburi

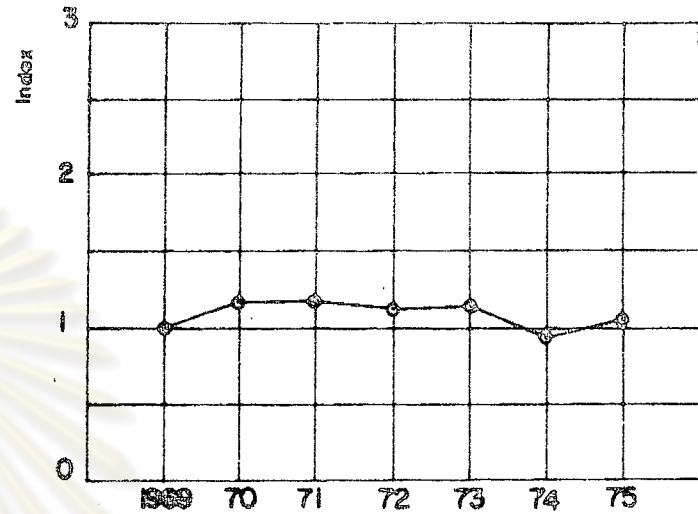


Fig. 49 - Average Yield of Sugar Cane :  
Changwad Chonburi

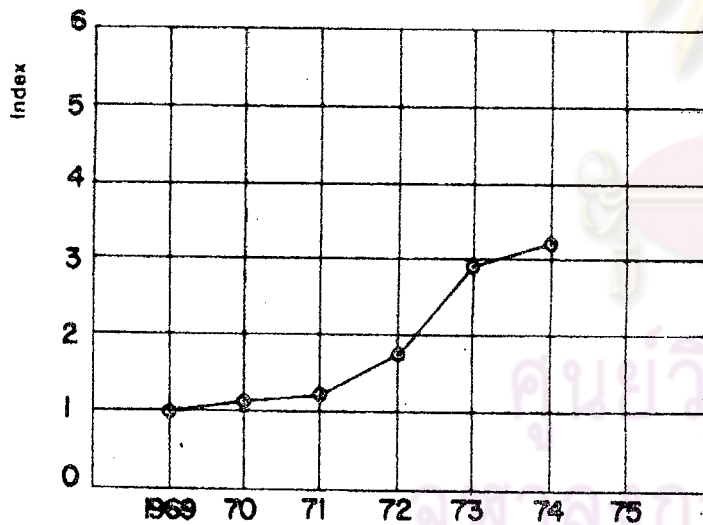


Fig. 50 - Sugar Cane Production :  
Whole Kingdom

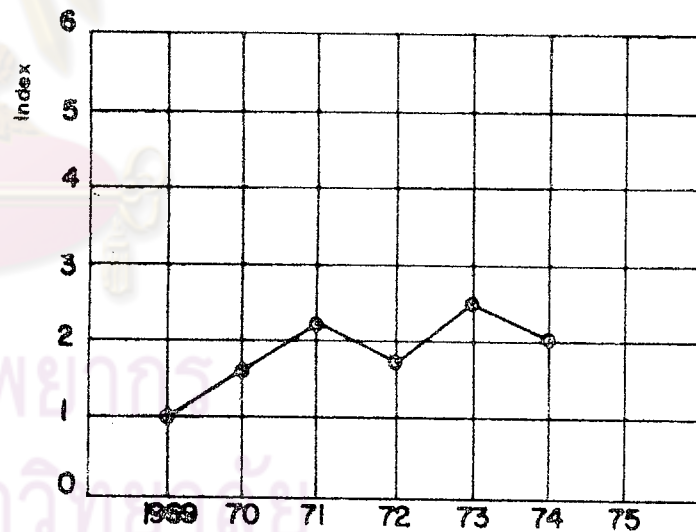


Fig. 51 - Sugar Cane Production :  
Seven Eastern Changwads

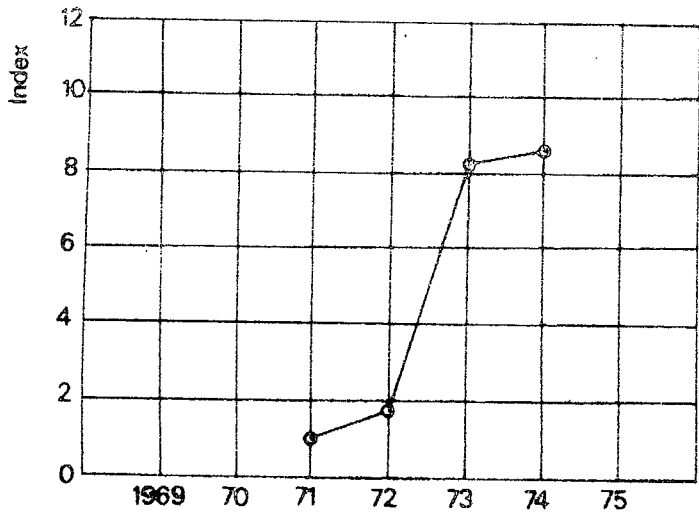


Fig. 52 — Sugar Cane Production: Two Amphoes in Changwad Rayong .  
A. Ban Khai and King A. Pluak Daeng

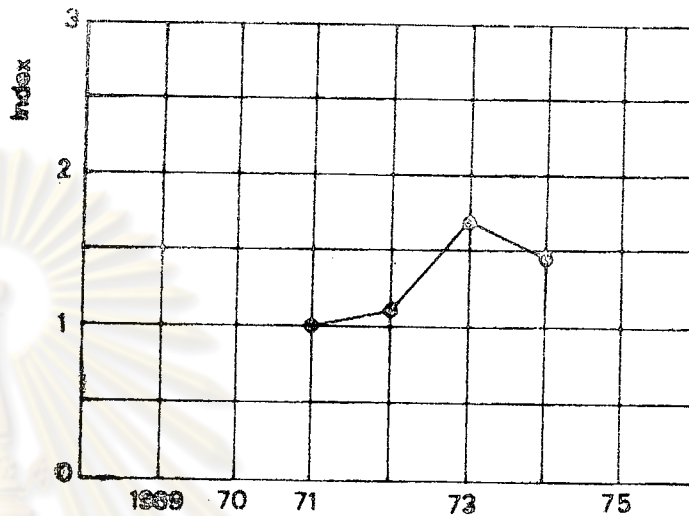


Fig. 53 — Sugar Cane Production :  
Changwad Rayong Less Two Amphoes

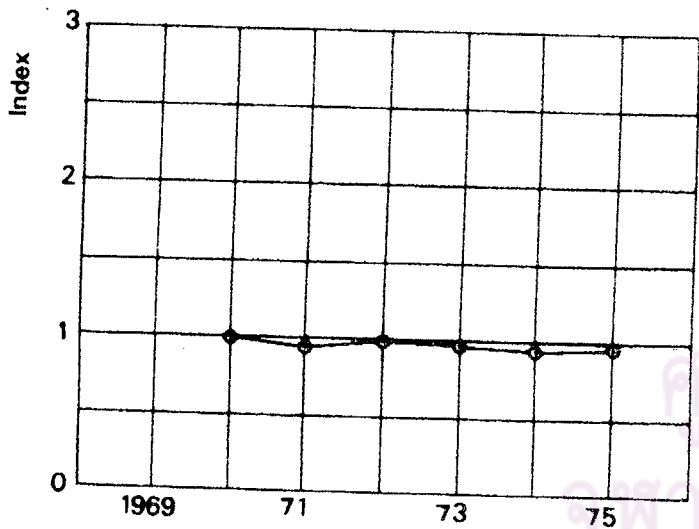


Fig. 54 — Sugar Cane Production : Amphoe Sri Racha  
in Changwad Chonburi

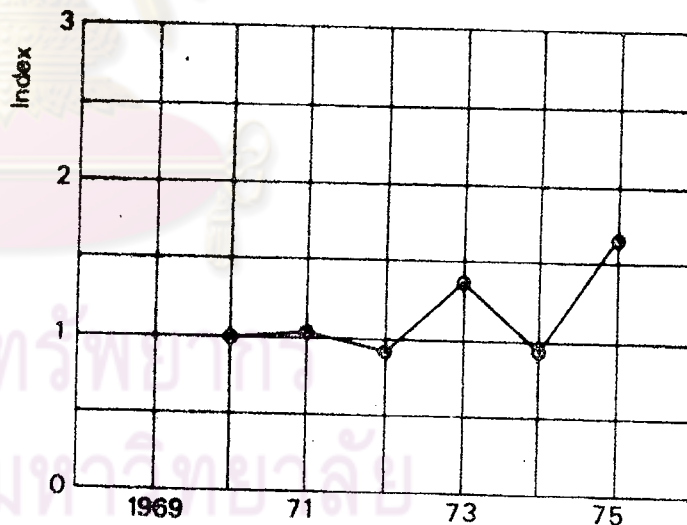


Fig. 55 — Sugar Cane Production :  
Changwad Chonburi Less A. Sri Racha

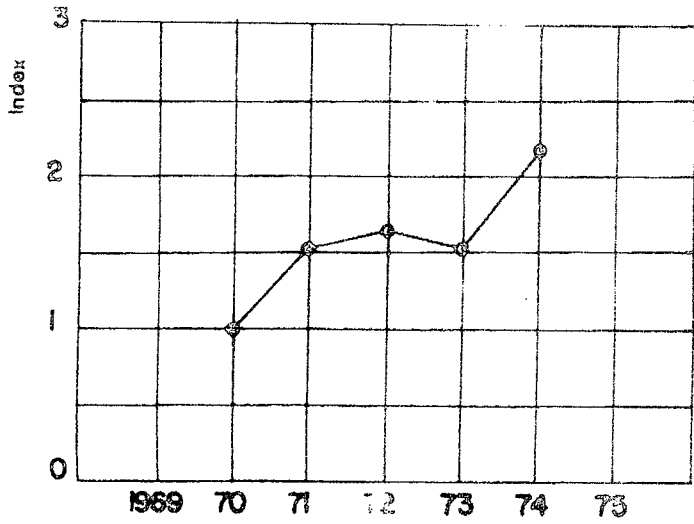


Fig. 56 - Rice Production : Changwad Rayong

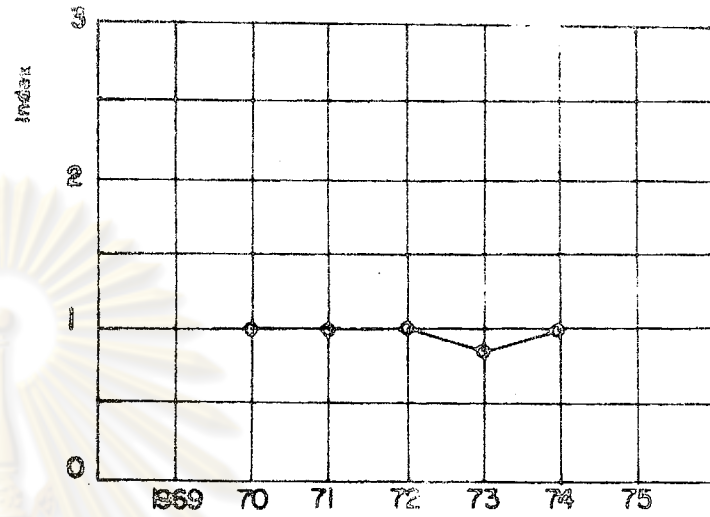


Fig. 57 - Average Yield of Rice : Changwad Rayong

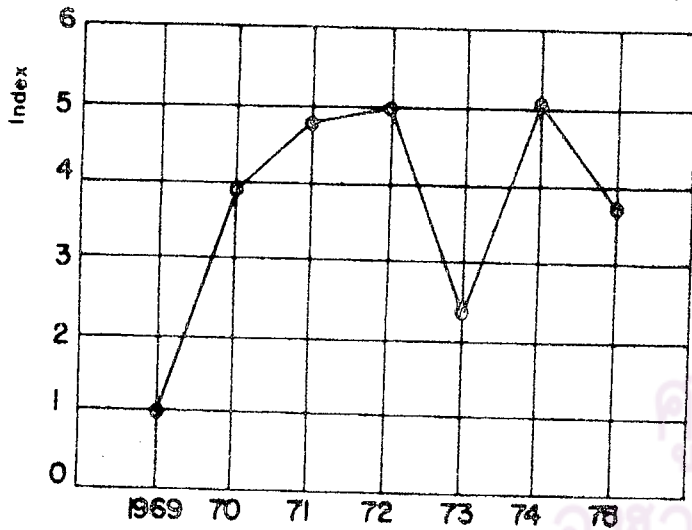


Fig. 58 - Rice Production : Changwad Chonburi

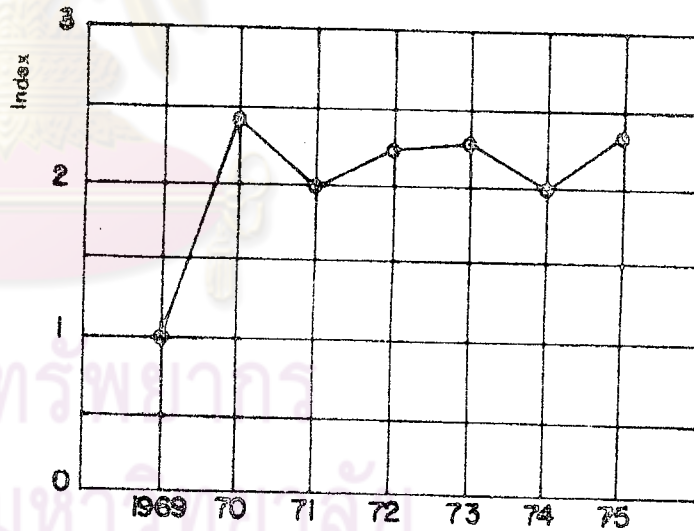


Fig. 59 - Average Yield of Rice : Changwad Chonburi

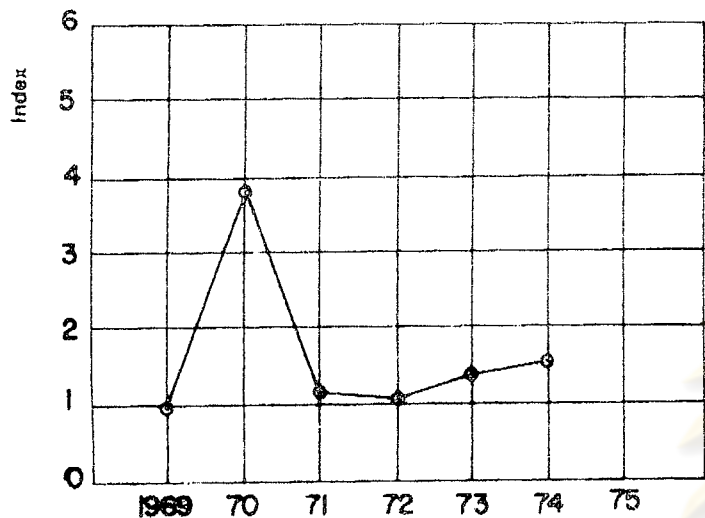


Fig. 60 — Peanut Production : Changwad Rayong

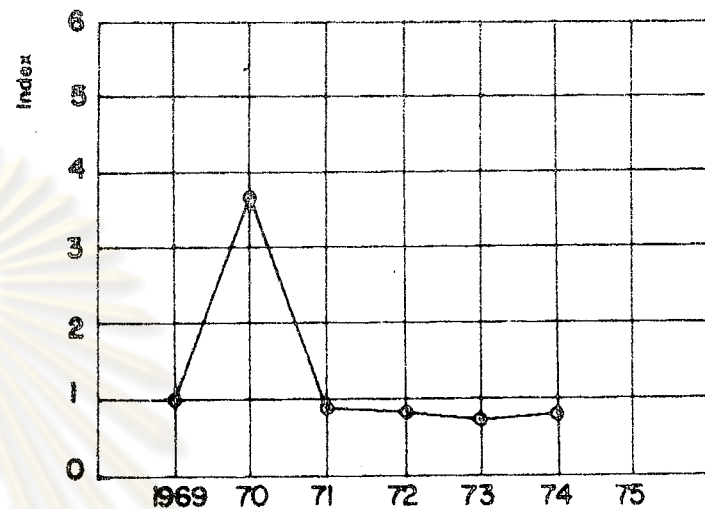


Fig. 61 — Average Yield of Peanuts :  
Changwad Rayong

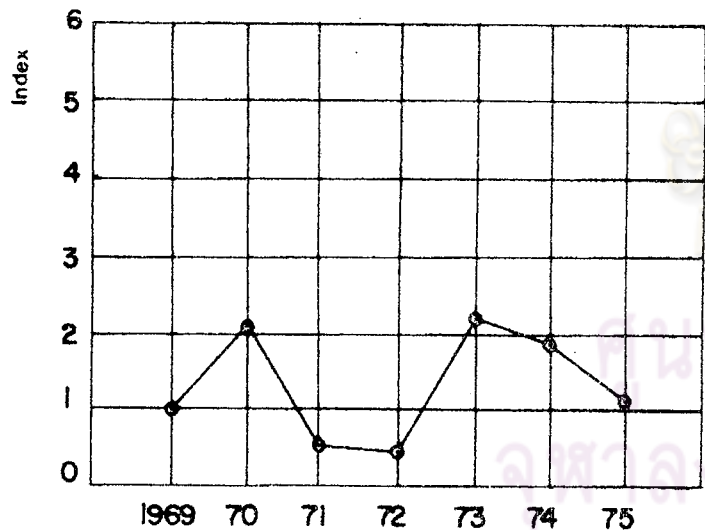


Fig. 62 — Peanut Production : Changwad Chonburi

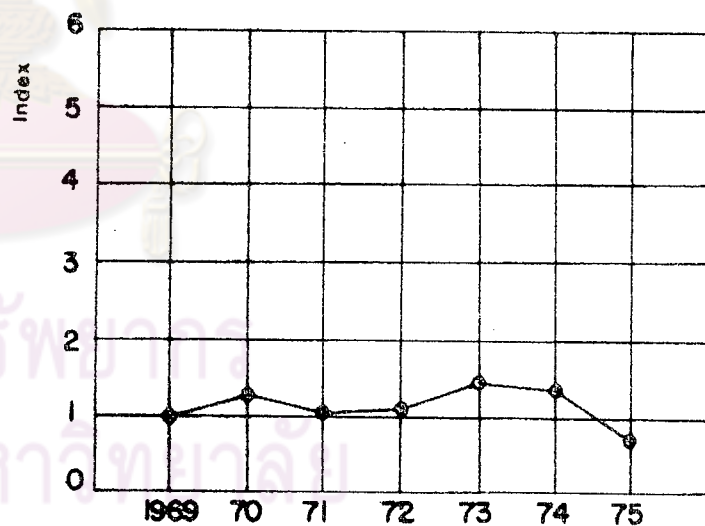


Fig. 63 — Average Yield of Peanuts :  
Changwad Chonburi

## Tapioca Exports

The cassava plant (genus manihot), through its fleshy edible rootstock, yields a nutritious starch; the granular preparation of this starch in its various forms is known as "tapioca"

Information about tapioca exports is reported regularly in the Bangkok Bank Monthly Review. Tables 54 through 57, inclusive, show values selected from this source. To better understand trends in the rather variable characteristics of this commodity, index numbers have been calculated for some of the parameters.

Table 54 and Fig. 64 show the total volume in metric tons of tapioca exported in the years 1961 through 1975. The total volume comprises the volume of pellets, flour, and other minor products. The exported volume seems to have increased year by year from 1963 to 1975; the highest rate of increase occurred in 1974. The total tonnage exported in 1974 was nearly 6 times that of the base year (1961) volume.

Table 55 and Fig. 65 show the total volume of exported tapioca distributed by months in 1975. These monthly volumes display substantial variations. The highest volume exported was in August, and the lowest occurred in June. However, review of the monthly amounts for other years show that there

was no clearly defined pattern, each year seems to be different from other years.

Table 56 shows the prices of exported tapioca in Baht per metric ton listed for each year from 1961 through 1975. Tapioca is formed in two major products: pellets and flour; minor products are listed as others. The relative exported amounts of these products were for 1975: 32 percent as pellets; 53 percent as flour; and 15 percent in other forms. It may be seen that from 1961 to 1969, the price of pellets varied both up and down. After 1969 the price increased year by year to 1975, reaching in 1975 more than twice that in 1961. The prices of flour and other less important products typically followed the pattern for pellets. An abrupt change in the price of flour occurred in 1973: from 1,760  $\text{฿/MT}$  in 1972 to 2,435  $\text{฿/MT}$  in 1973. The price of flour in 1975 was about  $2\frac{1}{2}$  times that in 1961. The other forms of exported tapioca showed variations in price from 1961 through 1975; the maximum value occurred in 1973, this dropped in 1974 and fell further in 1975. Table 57 shows the price of exported tapioca listed by months for 1975. It is seen that the price of pellets in April reached the highest for the year; in January the price was at its lowest for the year. The other months' prices varied somewhat.

In 1975 the price of flour varied from month to month, January and March had equally high prices; those in the other months ranged downward to 82 percent of the January price.

Table 54 - Total Volume of Exports of Tapioca, MT,  
Distributed by Years

Year	Volume, MT	Index
1961	443,376	1.00
1962	400,788	0.90
1963	427,443	0.96
1964	738,859	1.67
1965	719,442	1.62
1966	688,603	1.55
1967	781,357	1.76
1968	888,854	2.00
1969	975,091	2.20
1970	1,326,865	2.99
1971	1,112,466	2.51
1972	1,279,648	2.89
1973	1,713,706	3.87
1974	2,579,305	5.82
1975	2,355,962	5.31

Source: Bangkok Bank Monthly Review, September 1976

Table 55 - Total Volume of Exports of Tapioca, MT,  
Distributed by Months in 1975

Months	Volume, MT	Index
Jan.	204,567	1.00
Feb.	204,765	1.00
March	242,211	1.18
April	165,844	0.81
May	204,691	1.00
June	103,664	0.51
July	141,796	0.69
August	282,180	1.38
Sept.	185,407	0.91
Oct.	134,499	0.66
Nov.	248,804	1.22
Dec.	237,534	1.16

Source: Bangkok Bank Monthly Review, September 1976

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Table 56 - Tapioca Exports; Price, Baht/Metric ton,  
Distributed by Years

Year	Pellets	Index	Flour	Index	Others	Index
1961	818	1.00	1,221	1.00	556	1.00
1962	915	1.12	1,438	1.18	843	1.52
1963	753	0.92	1,679	1.38	792	1.42
1964	700	0.86	1,502	1.23	735	1.32
1965	772	0.94	1,571	1.29	786	1.41
1966	805	0.98	1,491	1.22	769	1.38
1967	806	0.99	1,530	1.25	689	1.24
1968	787	0.96	1,560	1.28	679	1.22
1969	820	1.00	1,510	1.24	751	1.35
1970	858	1.05	1,437	1.18	880	1.58
1971	1,012	1.24	1,689	1.38	1,195	2.15
1972	1,158	1.42	1,760	1.44	1,305	2.35
1973	1,337	1.63	2,435	1.99	1,318	2.37
1974	1,371	1.68	3,069	2.51	913	1.64
1975	1,825	2.23	3,088	2.53	874	1.57

Source: Bangkok Bank Monthly Review, September 1976

Table 57 - Tapioca Exports; Price, Baht/MT, Distributed  
by Months in 1975

Period	Pellets	Index	Flour	Index	Others
January	1,621	1.00	3,422	1.00	N.A.
February	1,882	1.16	2,796	0.82	"
March	1,638	1.01	3,423	1.00	"
April	2,138	1.32	3,171	0.93	"
May	1,730	1.06	2,842	0.83	"
June	1,874	1.16	2,921	0.85	"
July	1,994	1.23	2,939	0.86	961
August	1,670*	1.03	2,927	0.85	N.A.
September	2,001	1.23	3,098	0.91	"
October	1,962	1.21	3,332	0.97	"
November	1,937	1.19	3,090	0.90	"
December	1,796	1.10	3,084	0.90	814

\* Adjusted figure to be a reasonable value

Source: Bangkok Bank Monthly Review, September 1976

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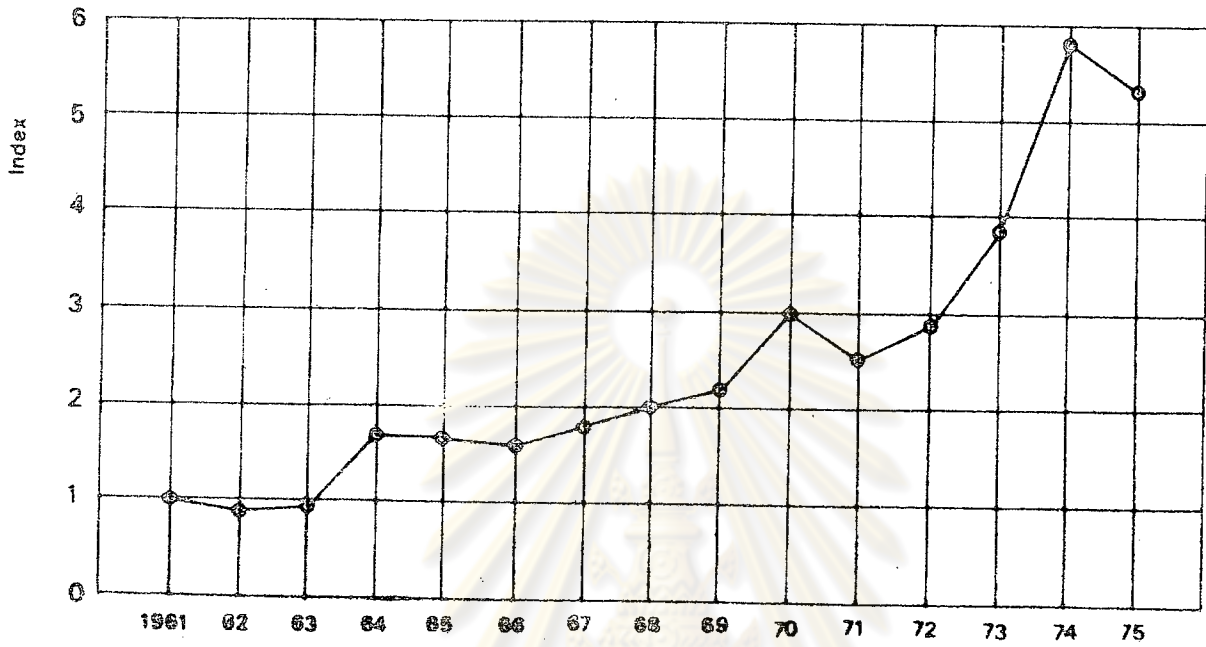


Fig. 64 - Total Volume of Exports of Tapioca, Distributed by Years

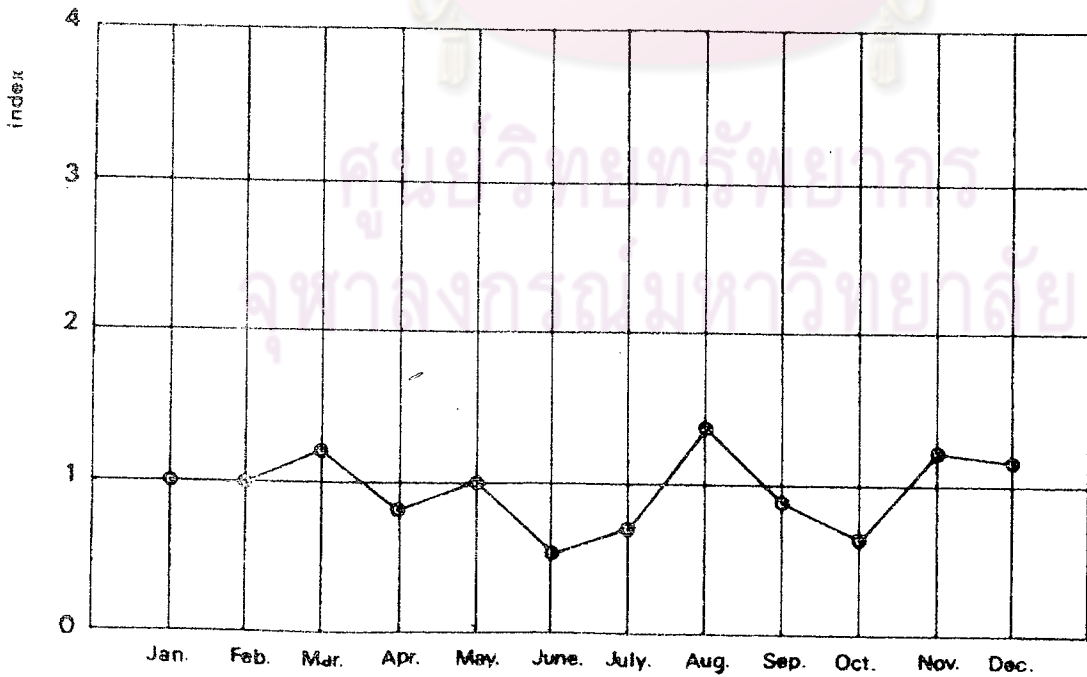


Fig. 65 - Total Volume of Exports of Tapioca, Distributed by Months in 1975

### Decision Making Regarding Crops to be Grown on the Farm

In an area where many kinds of crops can be grown, care must be taken in deciding what crop will likely produce the maximum benefit to the farmer. There are many factors to be taken into account: the type of soil, the kinds of plant strain available, and the probable marketing situation at harvest time. The crop to be grown must be suitable for the soil type of the cultivated area. The farmer must expect a high market demand for the crop at the time of harvesting. However, in the area of study, mainly only two kinds of crop were planted year after year: cassava and sugar cane. Thus, the principal decision to be reached by the farmers was the choice between cassava or sugar cane. From the 24 farmers who were interviewed in this research, it was reported that in 88 percent of the households the crop to be grown was decided by the head of the household; in 4 percent of the cases the decision was made by the housewife; and in 8 percent of the households by common decision. These figures indicate that farming decisions were led by the heads of households.

### Farmers' Requirements for Area of Farm

Inquiry was made as to whether the 24 interviewed farmers would prefer to have a larger farm. There were

75 percent of them who expressed a desire to have a larger area for farming. The additional area indicated as desirable averaged 70 rai. Compared to the presently owned area, this additional amount would represent an increase averaging 47 percent (the average farm area of the 24 households is 150 rai).

#### Sources Where Farmers Learned about Farming.

In the study area, two institutions are available to assist farmers with their farming problems. One is Government's District Agricultural Offices (Kaset Amphoe); these branch agricultural offices have been established in many of the agricultural districts in Thailand. Through these offices, the Government aims to disseminate new ideas and new techniques and methods of farming to the farmers. So the Kaset Amphoe is an office administered by the Ministry of Agriculture and Cooperatives that provides an agricultural advisory service. The another institution is the Agricultural Association, which is organized by farmers in local areas. All farmers are encouraged to be members of the Association. The members can ask for advice about farming and can seek financial assistance. The objective of this association is to enable the members to help each other with

any problem concerned with farming. Beside these two offices, knowledge in farming procedures was also found to come from neighbors and the farmers' parents. The percentage distribution of the primary use of each source of knowledge by the interviewed farmers is shown in Table 58.

Table 58 - Percentage Distribution of Primary Use of Each Source of Knowledge by Interviewed Farmers

Primary Source of Knowledge	No. of Interviewed Farmers who Primarily Used Each Source of Knowledge	Percent
Kaset Amphoe	9	38
Agricultural Association	5	21
Parents	1	4
Neighbors	2	8
None	7	29
Totals	24	100

### Types of Soil in the Areas Planted

From the sample of households interviewed, it may be seen that the soil in the planted areas along the Ban Khai-Ban Bung feeder road is mostly a sandy-clay. Table 59 describes the distribution of soil types in the study area. About 88 percent of total farms of the interviewed households occupied sandy-clay areas, 8 percent were on loose sand areas, and 4 percent were in areas of sand with gravel. From these data, it may be concluded that sandy soils are suitable for cassava and sugar cane growing.

### Labor Hired for Farming

It was found that 21 of the 24 interviewed households (about 88 percent) hired labor to help with farming operations. Most of the laborers came from the Northeastern region of Thailand; the remainder came from nearby changwads in the Central region of Thailand. Table 60 shows the distribution of places from which laborers were hired.

Table 59 - Distribution of Soil Types in the Area of Study

Type of soil	f	Percent
Sandy - clay	21	88
Loose sand	2	8
Sand and gravel	1	4
Totals	24	100

Table 60 - Distribution of Places From Which Laborers  
Were Hired

Places	f	Percent
Northeastern Thailand	16	70
Supanburi	1	4
Prachinburi	1	4
Angthong	1	4
Nearby villages	4	18
Totals	23	100



### Cost of Transportation of Crops

Transporting the two main crops, as reported by interviewed farmers in the year of study (November 1975), took place at various rates in different parts of the study area. For cassava, the transportation cost as shown in Table 61 varied from  $\text{P} 5$  to  $\text{P} 11$  per 100 kg; the average rate was  $\text{P} 6.70$  per 100 kg. The most frequently occurring cost (47 percent) for hauling cassava was  $\text{P} 6$  per 100 kg. These rates applied for hauls varying up to 20 km.

The cost of transporting sugar cane was  $\text{P} 4$  and  $\text{P} 5$  per 100 kg, but the most frequently occurring cost was  $\text{P} 4$  per 100 kg. This rate applied for hauls up to about 20 km. The distribution of transport cost for sugar cane is shown in Table 62.

The reason for these variations in transport cost is likely the different distances of hauling and the varying roadway conditions in different parts of the study area. Views of the study road showing a portion in bad condition and a portion in good condition are shown in Figs. 66 and 67. These sites were photographed in November 1976.

Table 61 - Transport Cost of Cassava

Transport cost, ฿ / 100 kg	f	Percent
5	2	11
6	8	47
7	3	18
8	3	18
11	1	6
Totals	17	100

Table 62 - Transport Cost of Sugar Cane

Transport cost, ฿ / 100 kg	f	Percent
4	5	63
5	3	37
Totals	8	100



Fig.66 - Transporting Cassava Root ,Feeder Road in Bad Condition



Fig. 67 – Transporting Chipped Cassava ,Feeder Road in Good Condition

## Price of Cassava and Sugar Cane

The interviewed farmers were asked about the prices their crops fetched in the last agricultural year. It was found that the price of cassava reported by the farmers varied from ₪ 400 per MT to ₪ 650 per MT. The average selling price of cassava was ₪ 497 per MT, and the modal value was ₪ 500 per MT. The variation of cassava price may be due to the situation of the market and the selling period. The distribution of cassava price informed by interviewed farmers in November 1975 is shown in Table 63.

In common with the pattern of price structure for primary agricultural products, the contrast between the farmers' selling price and the price for partially-processed products is striking. In the case of cassava grown in the feeder road study area, the farm price averaged about ₪ 500/MT, but (as previously shown in Table 56) the export price in the study year (1975) was ₪ 1825/MT for pellets and ₪ 3088/MT for flour. The very large increases displayed (265 percent increase for pellets, and 520 percent increase for flour) represent the value added by processing. Of course, built into these increases are the costs of processing and transportation at various stages and the profit margin of each of the successive handlers.

Table 63 - Selling Price of Cassava

Selling Price ฿ / MT	f.	Percent
400	4	18
450	3	13
500	11	48
580	3	13
600	1	4
650	1	4
Totals	23	100

All interviewed farmers reported that the selling price of sugar cane was constant at ฿ 300 per MT. This was really due to price support by the Government.

#### Cassava and Sugar Cane Production

Table 64 and 65 show the production of cassava and sugar cane, respectively, of the 24 interviewed households. The yield (kg/rai) and the gross income (Baht) totalled for cassava and sugar cane for the individual households have

been calculated and are shown in Table 66. It was found that the average yield of cassava for the interviewed households was 2.63 MT/rai. For comparison, the average yield of cassava from the statistical data for 1969 to 1974 in Changwad Rayong was 2.89 MT/rai, and in Changwad Chonburi was 2.38 MT/rai. It can be seen that these average yields of the interviewed farmers fell between those of the two changwads.

The average yield of sugar cane by the interviewed households was 6.24 MT/rai, while the yield from the statistical data in Changwad Rayong was 5.41 MT/rai, and in Changwad Chonburi was 7.60 MT/rai. Again, as with cassava, the typicalness of the interviewed sugar cane farmers has been demonstrated.

Using the average prices of these two crops -- as reported by the interviewed farmers: cassava, 497  $\text{฿}$  / MT and sugar cane, 300  $\text{฿}$  / MT -- the gross income per rai from each crop was calculated. The gross income per rai of cassava is  $\text{฿}$  1,307, while that of sugar cane is  $\text{฿}$  1,872. These figures were used to calculate the total gross incomes listed in Table 66.

Table 66 lists the total cultivated area (for both cassava and sugar cane), the total gross income from these two crops, and the average income per rai, ( $\text{฿}$  / rai) from

the two crops. It was found from the 24 interviewed households growing cassava and sugar cane, that the average gross income per rai was 1,670  $\text{฿}$  / rai.

Table 67 shows the distribution of the income per rai, as  $\text{฿}$  / rai, of the 24 interviewed households. A class interval of 500  $\text{฿}$  / rai was chosen for grouping the 24 samples. The frequency in percent and the cumulative percentages were calculated and have been plotted in Fig. 68. The arithmetic mean ( $\bar{X}$ ) by the grouped data is 1,396  $\text{฿}$  / rai\*. The median is 1,300  $\text{฿}$  / rai; this means that 50 percent of the interviewed households had an income equal to or greater than 1,300  $\text{฿}$  / rai; the other 50 percent had an income less than 1,300  $\text{฿}$  / rai.

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\*The difference between the arithmetic mean calculated from all observations (1670  $\text{฿}$ /rai) and that determined from the grouped data (1396  $\text{฿}$ /rai) is attributable to the relatively large class interval (500  $\text{฿}$ /rai) selected for the frequency distribution analysis.

Table 64 - Cassava Production from Interviewed Households

Interview No.	Cultivated Area, rai	Production, MT	Yield, kg/rai	Price, ฿/ton	Gross Income from Cassava, ฿
1	20	12	600	580	6,960
2	18	37.5	2,080	580	21,750
3	10	35	3,500	580	20,300
4	250	1,500	6,000	450	675,000
5	57	50	880	400	20,000
6	100	200	2,000	600	120,000
7	40	80	2,000	500	40,000
8	50	30	600	650	19,500
9	7	50	7,140	450	22,500
10	30	34	1,130	500	17,000
11	55	110	2,000	500	55,000
12	8	16.5	2,060	500	8,250
13	100	150	1,500	500	75,000
14	30	50	1,670	500	25,000
15	10	12.6	1,260	500	6,300
16	60	40	670	450	18,000
17	50	80	1,600	400	32,000
18	0	0	-	-	0
19	50	150	3,000	400	60,000
20	60	180	3,000	400	72,000
21	25	50	2,000	500	25,000
22	10	45	4,500	500	22,500
23	10	42	4,200	500	21,000
24	100	70	700	500	35,000

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Table 65 - Sugar Cane Production from Interviewed Households

Interview No.	Cultivated Area, rai	Production, MT	Yield, kg/rai	Price, ฿/ton	Gross Income from Sugar Cane, ฿
1	0	0	-	-	0
2	0	0	-	-	0
3	0	0	-	-	0
4	580	4,000	6,900	300	1,200,000
5	0	0	-	-	0
6	310	2,000	6,450	300	600,000
7	0	0	-	-	0
8	100	800	8,000	300	240,000
9	20	300	15,000	300	90,000
10	0	0	-	-	0
11	0	0	-	-	0
12	0	0	-	-	0
13	100	600	6,000	300	180,000
14	100	240	2,400	300	72,000
15	20	75	3,750	300	22,500
16	200	1,200	6,000	300	360,000
17	110	1,000	9,090	300	300,000
18	450	2,200	4,890	300	660,000
19	300	2,000	6,670	300	600,000
20	90	700	7,780	300	210,000
21	40	200	5,000	300	60,000
22	0	0	-	-	0
23	0	0	-	-	0
24	50	100	2,000	300	30,000

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Table 66 - Total Cultivated Area, Total Gross Income From  
Cassava and Sugar Cane

Interview No.	Total Cultivated Area, rai	Total Gross Income* ฿	Income per Rai, ฿/rai
1	20	7,000	350
2	18	22,000	1,220
3	10	20,000	2,000
4	830	1,875,000	2,260
5	57	20,000	350
6	410	720,000	1,760
7	40	40,000	1,000
8	150	260,000	1,730
9	27	113,000	4,180
10	30	17,000	570
11	55	55,000	1,000
12	8	8,000	1,000
13	200	255,000	1,280
14	130	97,000	750
15	30	29,000	970
16	260	378,000	1,450
17	160	332,000	2,080
18	450	660,000	1,470
19	350	660,000	1,880
20	150	282,000	1,880
21	65	85,000	1,310
22	10	23,000	2,300
23	10	21,000	2,100
24	150	65,000	430

\* Rounded to nearest 1000 Baht.



Table 67 - Distribution of Income per Rai,  $\text{฿} / \text{rai}$ , of  
Interviewed Households

Range of Income per Rai $\text{฿} / \text{rai}$	f	Percent	Cumulative Percent
0 - 500	3	13	13
501 - 1,000	6	25	38
1,001 - 1,500	5	21	59
1,501 - 2,000	5	21	80
2,001 - 2,500	4	16	96
2,501 - 3,000	0	0	96
3,001 - 3,500	0	0	96
3,501 - 4,000	0	0	96
4,001 - 4,500	1	4	100
Totals	24	100	

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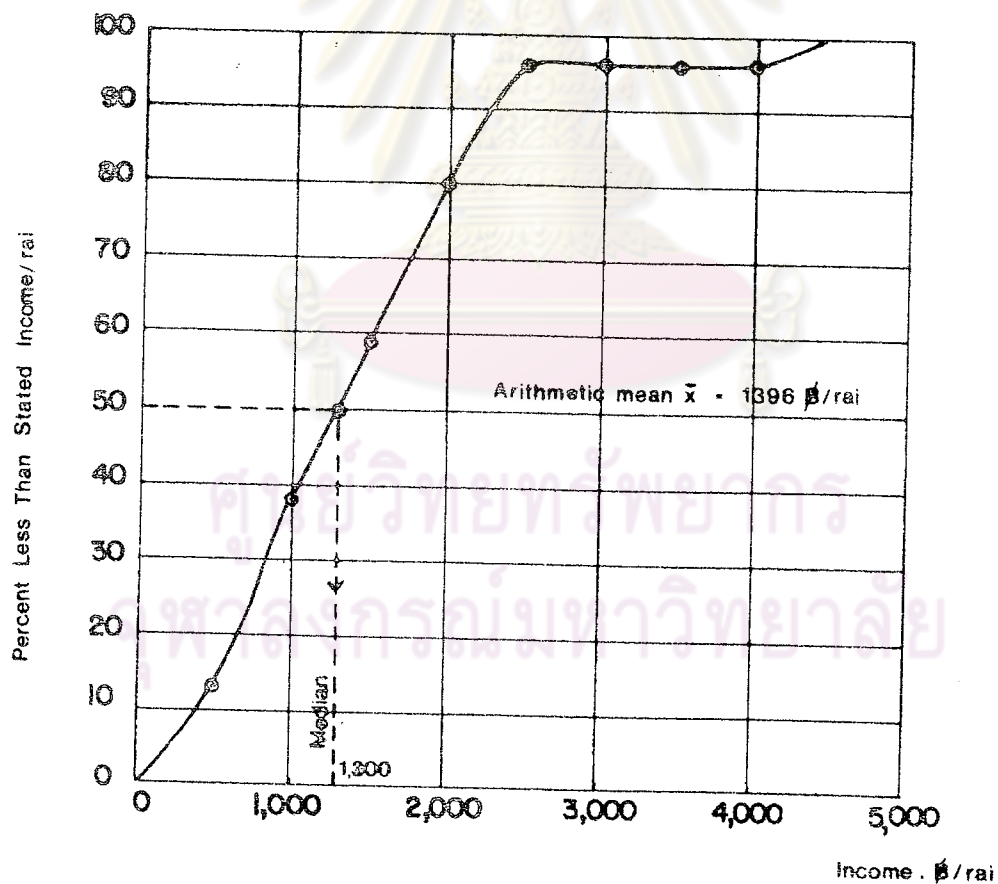
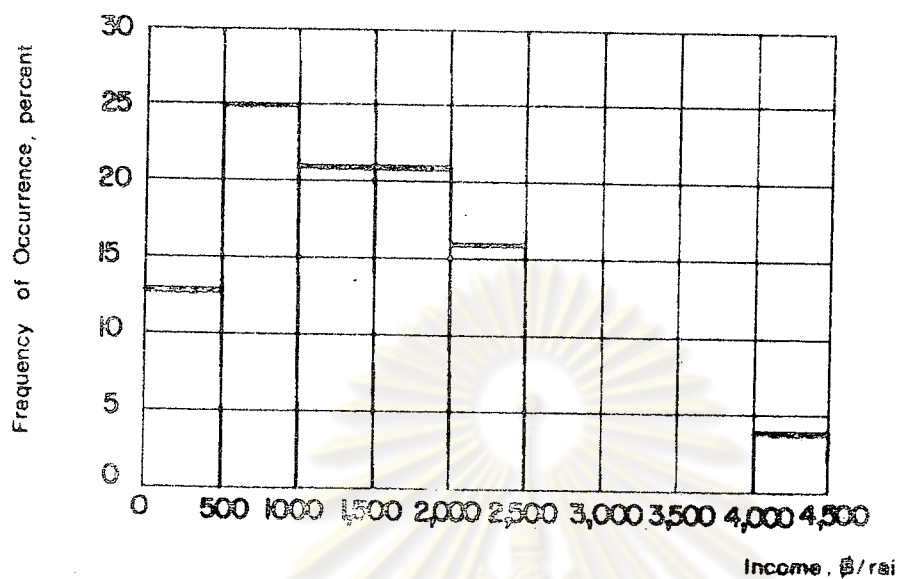


Fig. 68 - Histogram and Cumulative Distribution of Income per rai B/rai, for Cassava and Sugar Cane Combined of the Interviewed Households