

## Production and Export Potential of Lichee in Thailand

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### 1. Introduction

Lichee is of the genus *Nephelium*, in the family Sapindaceae. Lichee can be divided into two categories, as follows:

- The first type is the one presently planted. Its scientific name is *Litchi chinensis*, Sonn. It has several common names, such as: litche, litchee, lichee, leechee, laichi, and lychee, but the popular common names are litchi and lychee.
- The second type grows in the forests of the Philippines. Its scientific name is *Litchi philippinensis*. It can be used as the stock for the lichee plant.

Since lichee growing is distributed over several countries, such as India, Sri Lanka, Bangladesh, Burma, Thailand, Taiwan, Viet Nam, Kampuchea, South Africa, Madagascar, U.S.A., Brazil, South Japan, and Queensland in Australia, lichee appears under several names, as: litchi, litchee, lichee, lici, laichi, and leet-jee.

In Thailand, there are two types of lichee, as follows:

a) *Central region types, which can also be planted in the western region, are the following:*

- First, Kom, Hom Lan Chiek and Special Kom types are very popular for planting in the central region. They are easy to grow and quickly give fruit. The fruit weighs approximately 100 fruits/kg. We can gather the fruit in April;
- Second, Long Leaf or Kalok type produce fruit of weight nearly 100 fruits/2.5 kgs. It is the second choice for planting in the central region. We can harvest the fruit about two weeks later than the first type;

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- Third, Sarakthong type is harvested during 15-30 April. It can give fruit approximately 4-5 years after planting. The weight of these fruit is nearly 100 fruits/2 kgs;

- Fourth, Keuivan type can give fruit approximately 4-5 years after planting. The weight is 100 fruits/1.5 kg. They are used for processing; and

- Finally, Choragam type, weight 100 fruits/1.5 kg, and others.

*b) Northern region types are as follows:*

- First, Hong Houi type is the most popular for cultivation in the North. It often gives flowers every year. Its fruit will mature during mid to end of May. Their weight is approximately 30-40 fruits/kg. The seeds are rather big, but the skins are thin. Therefore, the fruit is easily damaged;

- Second, Oheia type is the second choice for planting in the North. Its fruit will mature in May. Their weight is nearly 40-50 fruits/kg;

- Third, Kimjeng type has been grown in the North for a long time. But it is not popular, because it does not flower every year. It can be grown and easily gives fruit on high land, more than 500-600 metres above sea level. Its fruit will mature in June. The price is good, because during this period other types of lichee have ceased to give fruit. There are many Kimjeng Lichee in Amphur Phang in Chiang Mai. The weight is nearly 40-50 fruits/kg.

We must note that we cannot use the northern region type of lichee for cultivation in the central region, because the climate is different. In fact, they will not produce flowers and fruit.

## **2. Major Production Areas and Total Production**

Lichee plantations in Thailand are in three areas, as follows:

- First, northern region, in Chiang Mai (Amphur Phang), Chiang Rai (Amphur Mueng, Mae Chan, Mae Sai, Chiang Sang), Nan, Phayao, and Lamphun;
- Second, central region, in Bangkok; and
- Third, western region, in Samut Songkhram (Amphur Ampave and Bang Khon Tee).

**Table 1** illustrates lichee plantation areas, their total production, and their production per 1,600 m<sup>2</sup>. From the Table, the total area increased almost every year, approximately by 37.73%, 3.42%, -6.21%, 14.20%, and 29.94% in 1981, 1982, 1983, 1984 and 1985. In 1985, the total planted area was equal to 51,328 × 1,600 m<sup>2</sup>, but the productive area was about 31,575 × 1,600 m<sup>2</sup>. Also, the total production was nearly 14,222 tons, or 450 kg./1,600 m<sup>2</sup>/year.

**Table 2** shows major lichee production areas and total production from 1980 to 1986. From the Table, lichee plantation areas and production are greatest in the North, approximately 90% of total planted area and production for the country. Especially the planted area and production in Chiang Mai, Chiang Rai, Nan and Phayao are nearly 97-99% of the total planted area in the North. Samut Songkhram has the best lichee plantation area of the West; the volume of planted area and production also increased.

**Table 3** illustrates the total provincial lichee plantation area, total production and total production per 1,600 m<sup>2</sup> from 1983 to 1986. From the Table, in 1983, Chiang Mai and Chiang Rai had the first and the second largest plantation areas in the North. Their total production was approximately 4,294 tons. Among other regions, Samut Songkhram possessed a greater planted area than others. Its total production was nearly 1,136 tons, or the average production per 1,600 m<sup>2</sup> was 560 kgs./year. This is higher than the average production of Chiang Rai, which is equal to 320 kgs./1,600 m<sup>2</sup>/year. In 1984, there were new plantations in Nakhon Nayok, Kanchanaburi and Bangkok; but Bangkok had the highest average production, about 360 kgs./1,600 m<sup>2</sup>/year. In 1985 the total average production increased to 415 kgs./1,600 m<sup>2</sup>/year. In 1986, it augmented to 450 kgs./1,600 m<sup>2</sup>/year.

### 3. Cost of Production/Yield

**Table 4** illustrates lichee production costs for the first three years from 1983. From the Table, we can note that in the first year, labor cost was highest, approximately 620 baht/1,600 m<sup>2</sup>. This includes preparing land, watering, and the labor cost for grass cutting. In the second and the third year, chemicals and labor

costs for eradication of plant pests were the highest, nearly 600 baht/1,600 m<sup>2</sup>. The total cost for the first three years was about 4,450 baht/1,600 m<sup>2</sup>.

**Table 5** shows lichee costs of production after the third year of planting from 1983. From the Table, insecticide cost was highest, approximately 26.86%. The second was harvesting cost, nearly 15.66%. The third and fourth were the labor cost for watering, and fertilizer, about 15.03% and 12.56%, respectively. Finally, we can see that the total cost per year was nearly 4,152 baht/1,600 m<sup>2</sup>.

**Table 1:** Lichee Total Planted Areas, their Total Production, and their Production per 1,600 m<sup>2</sup>, from 1980 to 1985

Year	Total Planted Area (1,600 m <sup>2</sup> )			Total Production (kgs.)	Total Production Per 1,600 m <sup>2</sup> kgs./1,600 m <sup>2</sup> /year
	Productive Area	Non-Productive Area	Total		
1980	13,212	12,500	25,712	6,128,040	465
1981	17,180	18,233	35,413	7,992,022	465
1982	18,427	18,197	36,624	9,959,653	540
1983	19,703	14,647	34,350	6,691,757	340
1984	20,193	19,308	39,501	4,249,910	212
1985	31,575	19,753	51,328	14,221,630	450

*Source : The Department of Agricultural Extension*

**Table 2: Lichee Regional Total Planted Areas, their Total Production, and their Production per 1,600 m<sup>2</sup>, from 1980 to 1986**

Year	Total Planted Area (1,600 m <sup>2</sup> )			Total Production (kgs.)	Total Production Per 1,600 m <sup>2</sup> /year	
	Region	Productive Area	Non- Productive Area			Total
<b>1980</b>		13,212	12,500	25,712	6,128,040	465
North		11,306	11,823	23,129	5,383,890	477
North East		34	123	157	9,350	275
East		10	5	15	3,000	300
West		1,862	549	2,411	731,800	397
<b>1981</b>		17,180	18,233	35,413	7,992,022	465
North		15,281	17,439	32,720	7,059,822	462
North East		36	251	287	10,800	300
East		10	5	15	3,000	300
West		1,853	538	2,391	918,400	495
<b>1982</b>		18,427	18,197	36,624	9,959,653	540
North		16,358	17,758	34,116	8,185,053	500
North East		99	74	173	20,650	208
East		10	5	15	5,000	500
West		1,960	360	2,320	1,749,000	892
<b>1983</b>		19,703	14,647	34,350	6,691,757	340
North		17,514	14,336	31,850	5,518,657	315
North East		101	58	159	21,400	211
East		58	13	71	14,900	256
West		2,030	240	2,270	1,136,800	560

Table 2 (Cont.)

Year	Total Planted Area (1,600 m <sup>2</sup> )			Total Production (kgs.)	Total Production Per 1,600 m <sup>2</sup> /year	
	Region	Productive Area	Non- Productive Area			Total
<b>1984</b>		20,193	19,308	39,501	4,249,910	212
North		16,595	14,664	31,259	3,673,820	222
North East		116	73	189	11,620	100
East		34	89	123	7,260	213
West		2,231	3,970	6,201	156,170	70
Central		1,217	512	1,729	401,040	360
<b>1985</b>						
North		22,849	15,616	38,465	9,008,330	396
North East		22	153	175	4,840	220
East		103	11	114	24,200	235
West		4,341	2,013	6,354	2,158,655	497
Central		1,236	523	1,759	610,800	494
<b>1986</b>						
North		26,925	17,407	44,332	11,676,331	434
North East		59	572	631	15,179	257
East		129	159	288	35,020	271
West		3,226	1,524	4,750	1,823,220	565
Central		1,236	91	1,327	671,880	543

Source : The Department of Agricultural Extension

**Table 3 : Lichee Regional Total Planted Areas, their Total Production, and their Production per 1,600 m<sup>2</sup>, from 1983 to 1986**

Region/ Province  1983	Total Planted Area (1,600 m <sup>2</sup> )			Total Production (kgs.)	Total Production Per 1,600 m <sup>2</sup> kgs./1,600 m <sup>2</sup> /year
	Productive Area	Non- Productive Area	Total		
<b>North</b>	17,514	14,336	31,850	5,518,657	315
Chiang Rai	6,538	2,947	9,485	2,088,000	320
Chiang Mai	7,353	8,028	15,381	2,205,900	300
Tak	-	202	202	-	-
Nan	1,758	1,042	2,800	492,240	280
Petchabun	103	142	245	28,840	280
Phayao	758	1,003	1,761	245,592	324
Mae Hong Son	38	155	193	15,960	420
Lampang	109	605	714	13,625	125
Lamphun	857	212	1,069	428,500	500
<b>North East</b>	101	58	159	21,400	211
Nakhon	76	27	103	11,400	150
<b>Ratchasima</b>					
Loei	25	31	56	10,000	400
Sakon Nakhon	-	21	21	-	-
<b>East</b>	58	13	71	14,900	256
Chonburi	48	13	61	14,400	300
Samut Prakan	10	-	10	500	50
<b>West</b>	2,030	240	2,270	1,136,800	560
Samut	2,030	240	2,270	1,136,800	560
Songkhram					
<b>Total</b>	<b>19,703</b>	<b>14,647</b>	<b>34,350</b>	<b>6,691,757</b>	<b>340</b>

*Source : The Department of Agricultural Extension*

Table 3 (Cont.)

Region/ Province  1984	Total Planted Area (1,600 m <sup>2</sup> )			Total Production (kgs.)	Total Production Per 1,600 m <sup>2</sup> kgs./1,600 m <sup>2</sup> /year
	Productive Area	Non- Productive Area	Total		
North	16,595	14,664	31,259	3,673,820	222
Chiang Rai	6,897	3,143	10,040	1,646,400	240
Chiang Mai	7,353	7,873	15,226	1,397,070	190
Tak	95	117	212	8,550	90
Nan	900	1,600	2,500	207,000	230
Phayao	1,030	1,347	2,377	319,300	314
Mae Hong Son	38	284	322	14,820	390
Lampang	56	277	333	12,880	230
Lamphun	226	23	249	67,800	300
<b>North East</b>	116	73	189	11,620	100
Nakhon	76	27	103	7,220	95
Ratchasima					
Loei	40	25	65	4,400	110
Sakon Nakhon	-	21	21	-	-
<b>East</b>	34	89	123	7,260	213
Chonburi	14	1	15	5,460	390
Nakhon Nayok	10	88	98	1,300	130
Samut Prakan	10	-	10	500	50
<b>West</b>	2,231	3,970	6,201	156,170	70
Kanchanaburi	-	20	20	-	-
Samut	2,231	3,950	6,181	156,170	70
Songkhram					
<b>Middle</b>	1,217	512	1,729	401,040	360
Bangkok	1,217	512	1,729	401,040	360
Total	20,193	19,308	39,501	4,249,910	212

Source : The Department of Agricultural Extension



Table 3 (Cont.)

Region/ Province  1985	Total Planted Area (1,600 m <sup>2</sup> )			Total Production (kgs.)	Total Production Per 1,600 m <sup>2</sup> /year
	Productive Area	Non- Productive Area	Total		
<b>North</b>					
Chiang Rai	7,532	4,709	12,241	3,604,320	480
Chiang Mai	11,164	7,503	18,667	4,000,680	360
Tak	115	42	157	20,700	180
Nan	1,343	1,149	2,492	389,410	290
Petchabun	297	200	497	94,720	320
Phayao	1,177	1,471	2,648	576,730	490
Mae Hong Son	192	225	417	97,920	510
Lampang	77	128	205	23,870	310
Lamphun	952	179	1,131	199,920	210
<b>North East</b>					
Loei	22	132	154	4,840	220
<b>East</b>					
Nakhon Nayok	87	11	98	22,620	260
Samut Prakan	16	-	16	1,600	100
<b>West</b>					
Samut	4,231	1,950	6,181	2,136,655	505
Songkhram					
Petchaburi	110	33	143	22,000	200
<b>Middle</b>					
Bangkok	1,194	447	1,641	597,000	500
Ayutthaya	30	50	80	9,600	320
Saraburi	12	26	38	4,200	350
<b>Total</b>	<b>28,551</b>	<b>18,316</b>	<b>46,867</b>	<b>11,606,825</b>	<b>415</b>

Source : The Department of Agricultural Extension

Table 3 (Cont.)

Region/ Province  1986	Total Planted Area (1,600 m <sup>2</sup> )			Total Production (kgs.)	Total Production Per 1,600 m <sup>2</sup> /year
	Productive Area	Non- Productive Area	Total		
North					
Chiang Rai	8,643	5,152	13,795	4,563,504	528
Chiang Mai	14,094	8,794	22,888	5,581,224	396
Tak	115	78	193	22,770	198
Nan	1,343	1,149	2,492	428,427	319
Petchabun	270	182	452	81,000	300
Phayao	1,082	1,495	2,577	583,198	539
Mae Hong Son	232	148	430	130,152	581
Lampang	194	121	315	66,154	341
Lamphun	952	228	1,180	219,912	231
<b>North East</b>					
Nakhon	-	-	-	-	-
Ratchasima					
Loei	51	115	166	13,515	265
Sakon Nakhon	8	17	25	25	1,664
Sisaket	-	290	290	-	-
Nakhon Phanom	-	150	150	-	-
<b>East</b>					
Chonburi	-	-	-	-	-
Samut Prakan	10	-	10	1,100	110
Nakhon Nayok	89	9	98	24,920	280
Chantaburi	30	150	180	9,000	300
<b>West</b>					
Samut	3,186	1,514	4,700	1,816,020	570
Songkhram					
Ratchaburi	40	10	50	7,200	180
<b>Middle</b>					
Bangkok	1,194	15	1,209	656,700	550
Ayuthaya	30	50	80	10,560	352
Saraburi	12	26	38	4,620	385
Total	31,575	19,753	51,328	14,221,630	450

Source : The Department of Agricultural Extension

**Table 4: Lichee Cost of Production During the First Three Years of Planting**  
(from 1983)

	<b>Baht/1,600 m<sup>2</sup></b>
<b>The First Year</b>	
1. Plant cost 20 baht/plant, 12 plants	240
2. Preparing land 10 baht/hole × 12 holes	120
3. Manure 10 kgs × 1.50 baht/hole	180
4. Labor cost for watering	400
5. Grass cutting	100
Total	1,040
<b>The Second and Third Years</b>	
1. Manure 15 kgs./plant × 1.50 baht/kg × 12 plants	270
2. Fertilizer 2 kgs/plant × 6.80 baht/kg × 12 plants	245
3. Insecticide	400
4. Labor cost for watering	200
5. Grass cutting	400
Total	1,515
<b>Total Cost of Production for the First Three Years</b>	
1. Total variable cost for the first three years	4,070
2. Fixed cost	380
2.1 Land tax 45 baht	
2.2 Land use 310 baht	
2.3 Depreciation 25 baht	
Total cost for the first three years of planting	4,450
Average cost per year for 20 years	223

*Source : Social Research Institute, Chulalongkorn University*

**Table 5 : Lichee Cost of Production after the Third Year of Planting (in 1983)**

	<b>Baht/1,600 m<sup>2</sup></b>	<b>%</b>
1. Average cost per year	223	5.41
2. Manure 12 kgs/plant × 12 plants × 1.50 baht/kg.	270	6.55
3. Fertilizer 6 kgs/plant × 12 plants × 7.20 baht/kg.	518	12.56
4. Insecticide	1,108	26.86
5. Labor cost for watering	620	15.03
6. Grass cutting	200	4.85
7. Pruning	12	0.29
8. Labor cost for covering fruit	35	0.85
9. Paper bags 2,000 bags × 0.02 baht/bag	40	0.87
10. Harvesting cost	646	15.66
11. Basket cost (20 kgs/basket) 10 baht/ basket × 48 baskets	480	11.64
<b>Total</b>	<b>4,152</b>	<b>100</b>

*Source : Social Research Institute, Chulalongkorn University*

### 3. Processing Costs

**Table 7** shows lichee processing costs for 1 box (24 cans). The total production cost averages 576 baht/box, or 24 baht/can. From the Table, lichee fruit cost is the largest portion of the cost structure, nearly 70.83%. The second is packaging cost, approximately 14.58%. The third is labor cost and other costs, about 4.51%.

When we compare lichee processing costs to other fruit processing cost structures in **Table 8**, we note that lichee and longan raw material costs are the largest, approximately 70% and 71% of total costs, respectively.

Canned lichee sale prices are 24 to 30 baht/can, or approximately 600 to 700 baht/box (24 cans or 13.56 kgs.). The profit is 600 to 576 (24 baht/box) and 700 to 476 baht/box. The market will be explained in the next section.

**Table 7 : Lichee Processing Cost (24 Cans/Box).**

List	Value (Baht)	Percentage
1. Fresh lichee (16 kgs.)	408	70.83
2. Packaging cost	84	14.58
3. Labor cost	26	4.51
4. Oil, gas and electricity	13	2.26
5. Depreciation	19	3.31
6. Other	26	4.51
Total	576	100.00

*Source : From the Survey of the Industrial Economic Development Center in the North.*

**Table 8 : Present Thai Fruit Processing Cost Structure***Unit: Percentage*

Production Cost Structure	Canned Pineapple %	Canned Longan %	Canned Rambutan %	Canned Lichee %	Average %
1. Raw material (fresh fruit)	52	71	59	70	63.0
2. Raw material	34	20	26	15	24.3
3. Raw material	5	4	6	5	5.0
4. Raw material	9	5	7	10	7.7
Total	100.00	100.00	100.00	100.00	100.00

*Source : Ready Food Processing Association.*

*Industrial Business Division, the Ministry of Industry.*

## LICHEE MARKETING AND HANDLING

### 1. Domestic Demand

The bulk of lichee fruit, about 90% of total production, goes to meet domestic demand. There remains only a small volume for export. The most important fresh lichee markets are in Chiang Mai (Amphur Mueng) and Bangkok. Consumer demand in Bangkok is the larger. 70% of lichee fruit is sold in several central domestic markets, such as: Mahanak Market, Parkklongtalard and Hard Yai. The remaining volume is sold to foreign markets. The fruit remaining from grading are sent to processing factories.

### 2. Lichee Price

Planters apply a local price, but merchandisers use a market price for buying fruit. Lichee price varies according to the type, quality and size.

Tables 9, 10 and 11 show planters' prices for lichee from 1982 to 1987. From Table 9, the first grade average planters' price was approximately 53.20 baht/kg. But the second grade average planters' price was nearly 39.70 baht/kg. (Table 10). But the average planters' price for mixed grade was about 27.01 baht/kg. (Table 11). In 1987 the lichee average price was higher than in the preceding year, by approximately 12.38% (calculated from the first grade average planters' price in 1986, approximately 52.50 baht/kg. and about 59 baht/kg. in 1987).

Table 12 illustrates lichee wholesale prices in Chiang Mai from 1984 to 1987. From the Table, the mixed grade average price was 20 baht/kg. in 1984. The price increased to 33 baht/kg. in 1985, and 37.33 baht/kg. in 1986. For the first grade the price varied from 55 baht/kg. to 74.33 baht/kg. The price for the second grade fluctuated from 44.33 baht/kg. to 55.33 baht/kg.

Table 13 indicates lichee wholesale prices in Chiang Rai, Nan and Samut Songkhram from 1984 to 1985. The first grade wholesale price in Chiang Rai decreased by about 0.75 baht/kg. in 1985. But the second grade and mixed grade wholesale prices increased from 34.12 baht/kg. and 23.50 baht/kg. to 39.00 baht/kg. and 26.50 baht/kg., respectively.

The first and second grade wholesale prices in Nan in 1984 were 33.50 baht/kg. and 27.25 baht/kg., respectively.

Finally, for lichee wholesale prices in Samut Songkhram in 1984: the first grade was 100 baht/kg., the second was 80 baht/kg., and the mixed grade was 55 baht/kg. (see Table 14).

### 3. Market Channels/Delivery

**3.1 Method of Selling Lichee.** There are three procedures, as follows:

- First, planters sell their fruit directly to their consumers. This method is rarely applied;
- Second, planters sell their fruit to local merchandisers, or nearby provincial middlemen, or wholesalers in Bangkok, in order to distribute it to consumers in Bangkok. 90% of planters apply this method. They will sell approximately 60% of their fruit during the gathering period. The remaining 30% is sold before maturity. Another 10% of planters transport their product to sell in other areas;
- Finally, planters gather their fruit themselves, and sell them.

**Table 9: The First Grade Lichee Planters' Price from 1982 to 1987**

(Unit : Baht/kg.)

Month	Year	1982	1983	1984	1985	1986	1987
January		-	37.50	-	-	-	-
April		-	-	68.25	55.00	-	60
May		-	41.67	37.63	41.25	45	52
June		55.00	50.00	-	72.50	60	65
Average		55.00	43.05	52.94	56.25	52.50	59

*Source : The Bureau of Agricultural Economics,  
The Ministry of Agriculture and Cooperatives.*

**Table 10: The Second Grade Lichee Planters' Price from 1982 to 1987***(Unit : Baht/kg.)*

Month	Year	1982	1983	1984	1985	1986	1987
April		-	-	51.33	40.00	-	50
May		-	30.00	28.19	28.75	38	42
June		40.00	30.00	-	42.50	50	50
Average		40.00	30.00	39.76	37.08	44	47.33

*Source : The Bureau of Agricultural Economics,  
The Ministry of Agriculture and Cooperatives.*

**Table 11: The Mixed Grade Lichee Planters' Price from 1982 to 1987***(Unit : Baht/kg.)*

Month	Year	1982	1983	1984	1985	1986	1987
March		-	19.50	-	-	-	-
April		-	-	45.83	30.00	-	25
May		-	25.00	26.25	20.06	25	28
June		20.00	25.00	-	30.00	32	30
Average		20.00	23.16	36.04	26.69	28.50	27.66

*Source : The Bureau of Agricultural Economics,  
The Ministry of Agriculture and Cooperatives.*



Table 12: Lichee Wholesale Price in Chiang Mai from 1984 to 1987

Month	Year	1984			1985			1986			1987			
		Grade	First	Second	Mixed	First	Second	Mixed	First	Second	Mixed	First	Second	Mixed
April		-	-	-	-	65	50	38	-	-	-	80	58	34
May		-	-	20.00		60	35	25	58	50	36	68	50	38
June		-	-	-		75	48	36	78	60	40	75	58	40
Average		-	-	20.00		66.66	44.33	33	68	55	38	74.33	55.33	37.33

Note: These are average prices of several types of lichee:

Hong Houi, Oheia, Kimjeng and Jakapad.

**Table 13: Lichee Wholesale Price in Chiang Rai, Nan and Samut Songkhram  
from 1984 to 1985**

Province	Year	1984		1985	
		April	May	May	June
<b>Chiang Rai</b>					
• first grade		-	48.75	46.00	50.00
• second grade		-	34.12	38.00	40.00
• mixed grade		-	23.50	23.00	30.00
<b>Nan</b>					
• first grade		-	33.50	-	-
• second grade		-	27.25	-	-
<b>Samut Songkhram</b>					
• first grade		100.00	-	-	-
• second grade		80.00	-	-	-
• mixed grade		55.00	-	-	-

*Source : The Bureau of Agricultural Economics,  
The Ministry of Agriculture and Cooperatives.*

**Table 14: Air Transportation Cost of Fresh Fruits and Vegetables (SCR 0007)**  
Effective from 1st October 1987 to 2nd October 1988.

<b>From Bangkok to:</b>	<b>Min. Weight</b>	<b>Rate in BHT</b>
Aalborg, Denmark	As for Copenhagen	
Aarhus, Denmark	As for Copenhagen	
Abu Dhabi, UAE	100	43.00
	250	40.00
	500	36.00
Amman, Jordan	100	45.00
	250	42.00
	500	37.00
Amsterdam, Netherlands	100	56.00
	500	44.00
	750	42.00
	1000	40.00
Athens, Greece	100	50.00
	500	40.00
	750	37.00
Baghdad, Iraq	100	43.00
	250	40.00
	500	36.00
Bahrain	100	43.00
	250	40.00
	500	36.00
Bandar Seri Begawan	100	20.00
	250	18.00
	500	17.00
Düsseldorf, Germany	100	56.00
	500	44.00
	750	42.00

Table 14: (Cont.)

From Bangkok to:	Min. Weight	Rate in BHT
Frankfurt, Germany	100	56.00
	250	46.00
	500	44.00
	750	42.00
	1000	40.00
Geneva, Switzerland	As for Zürich	
Gothenborg	100	61.00
	500	46.00
Hamburg, Germany	100	56.00
	500	44.00
	750	42.00
	1000	40.00
Helsinki, Finland	100	59.00
	500	44.00
Hong Kong	100	10.10
Jakarta, Indonesia	100	28.00
Jeddah, Saudi Arabia	100	43.00
	250	40.00
	500	36.00
Basle, Switzerland	As for Zürich	
Berne, Switzerland	As for Zürich	
Billund, Denmark	As for Zürich	
Bordeaux, France	As for Zürich	
Brisbane, Aust.	500	58.00
	1000	47.00
Brussels, Belg.	100	56.00
	250	44.00
	500	42.00

Table 14: (Cont.)

From Bangkok to:	Min. Weight	Rate in BHT
Cairo, Egypt	100	48.00
	500	44.00
	750	39.00
Cologne, Germany	100	56.00
	500	44.00
	750	42.00
Copenhagen, Denmark	100	59.00
	500	44.00
Dharan, Saudi Arabia	100	43.00
	250	40.00
	500	36.00
Dubai, UAE	100	43.00
	250	40.00
	500	36.00
Kuala Lumpur, Malaysia	250	11.70
	500	10.80
	1000	9.80
Kuwait	100	43.00
	250	40.00
	500	36.00
Lille, France	As for Paris	
London, U.K.	100	56.00
	500	44.00
	750	42.00
	1000	40.00
Los Angeles, U.S.A.	100	54.00
	300	51.00
	500	48.00

Table 14: (Cont.)

From Bangkok to:	Min. Weight	Rate in BHT
Luxemburg, Lux.	100	56.00
	500	44.00
	750	42.00
Lyon, France	As for Paris	
Malmö, Sweden	100	61.00
	500	46.00
Manchester, U.K.	100	60.00
	500	48.00
Marseilles, France	As for Paris	
Melbourne, Aust.	500	58.00
	1000	47.00
Miami, U.S.A.	45	87.00
	100	83.00
	300	75.00
	500	67.00
Milan, Italy	100	59.00
	500	46.00
	750	44.00
Montreal, Canada	100	60.00
	300	57.00
	500	54.00
Mulhouse, France	As for Paris	
Munich, Germany	100	56.00
	250	46.00
	500	44.00
	750	42.00
Muscat, Oman	100	43.00
	250	40.00
	500	36.00

Table 14: (Cont.)

From Bangkok to:	Min. Weight	Rate in BHT
Naples, Italy	100	59.00
	500	46.00
	750	44.00
Nice, France	As for Paris	
Osaka, Japan	250	32.00
	500	30.00
Oslo, Norway	100	63.00
	500	48.00
Paris, France	100	56.00
	500	44.00
	750	42.00
	1000	49.00
Penang, Malaysia	50	11.70
	500	10.80
	1000	9.80
Perth, Aust.	500	58.00
	1000	47.00
Pisa, Italy	100	59.00
	500	46.00
	750	44.00
Riyadh, Saudi Arabia	100	43.00
	250	40.00
	500	36.00
Rome, Italy	100	56.00
	500	44.00
	750	42.00
Saarbrucken, Germany	100	58.00
	500	46.00
	750	44.00

Table 14: (Cont.)

From Bangkok to:	Min. Weight	Rate in BHT
Seattle, U.S.A.	100	54.00
	300	51.00
	500	48.00
Sharjah	100	43.00
	250	40.00
	500	36.00
Singapore	250	11.70
	500	10.80
	1000	9.30
Stockholm, Sweden	100	63.00
	500	48.00
Strasbourg, France	As for Paris	
Sydney, Aust.	500	58.00
	1000	47.00
Taipei, Taiwan	250	25.00
	500	24.00
	1000	23.00
Tokyo, Japan	250	32.00
	500	30.00
Vancouver, Canada	100	60.00
	300	57.00
	500	54.00
Vienna, Austria	100	60.00
	500	52.00
Zürich, Switzerland	100	56.00
	500	44.00
	750	42.00
From Phuket to Singapore	100	10.00
	250	8.00
From Hat Yai to Singapore	100	10.00
	250	8.00

Source : The Department of Air Commerce.



to planters' associations, in order to transfer the product to central markets in Bangkok. Besides which, some big planters will sell their fruit directly to central fresh markets in Bangkok.

**3.2 Lichee Market Information.** The source of planters' price information is two-fold: from middlemen and the mass media. Normally, merchandisers receive lichee price information from more than two sources. The frequency of information receipt is rather high, at least once per day. Grade price determinations from middlemen in Bangkok are sent for instance by telegraph.

**3.3 Methods of Transport.** Most domestic transport is by truck; but transport from Samut Songkhram must be by boat. Export transport is normally by air, except to nearby countries, for which cars or ships are used.

**3.4 Air Transport Costs** are shown in Table 14.

### **3.5 Wholesale and Export Markets**

Lichee markets will be classified at two levels, as follows:

- First, wholesale markets that are at the centres for wholesale distribution of fresh fruit in Bangkok, such as Talard Vang Mahanak, Talard Padung Kung Kasem, the Market Organization, Talard Yod Piman, and Talard Chergsapanpud. Among these markets, Talard Vang Mahanak is the biggest wholesale market. Wholesalers in the market will distribute their fruit to retailers in Bangkok, exporters, fruit processing factories in Bangkok, and consumers. A wholesale market may also be situated in a provincial center, to sell fruit up-country, to retailers and consumers.

- Second, the export market: Exporters will collect fruit for export from planters or wholesalers at the wholesale market in Bangkok (see Figure 1.).

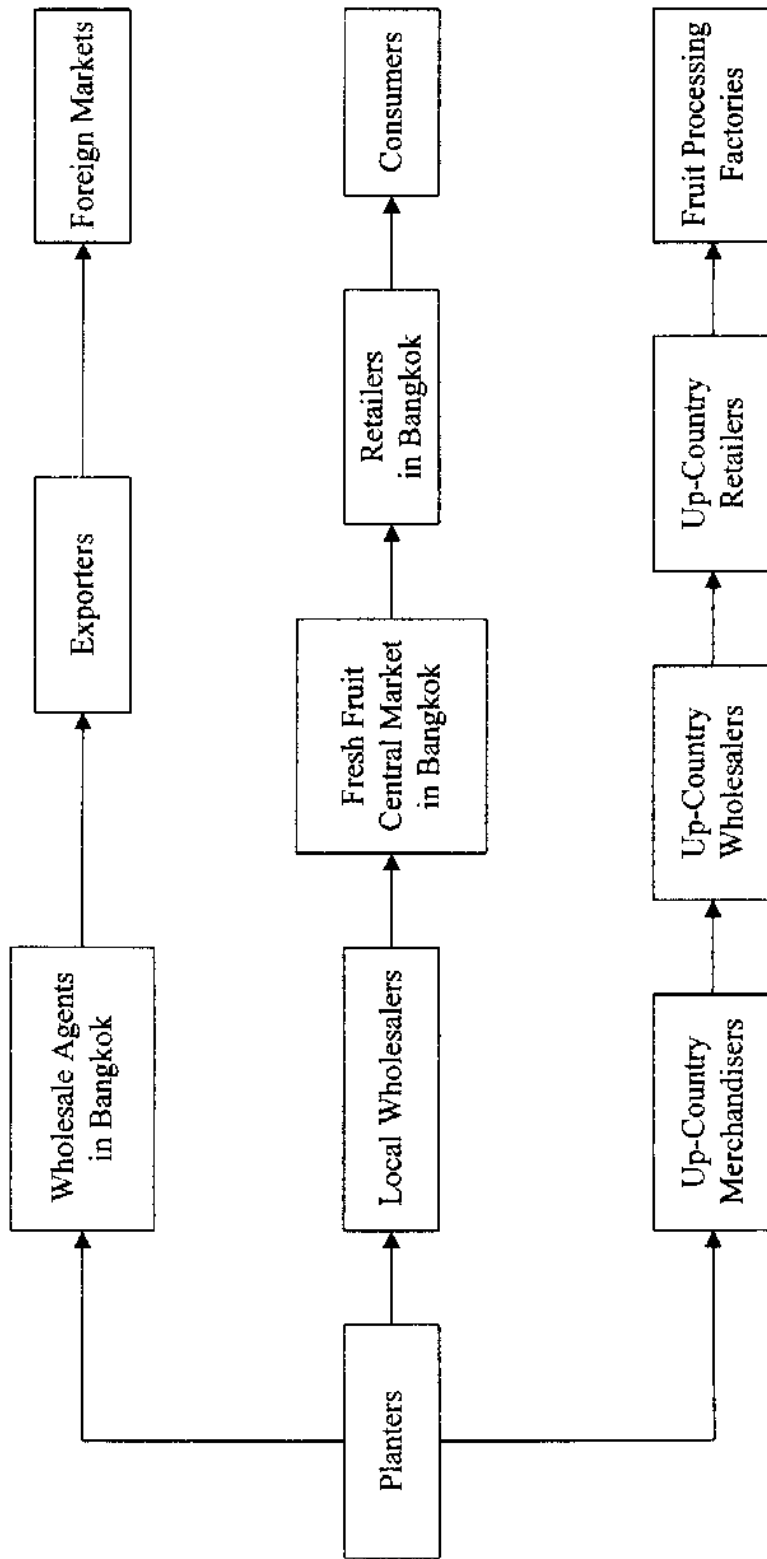
### **3.6 Lichee Market Channels/Delivery**

The majority of domestic markets depend on local middlemen for distributing fruit to consumers and to processing factories. The procedures for fresh lichee trading in the various principle markets are the following:

- First, merchants buy lichees from planters and local collectors, and sell them to various markets themselves;

- Second, middlemen or brokers (“yong”) are sales agents for planters or local collectors;
- Third, planters have three ways of distributing their fruit, as follows:
  - Direct sale to consumers and processing factories;
  - Sale to local middlemen at plantations, who will transfer their fruit to other middlemen in Bangkok or to consumers;
  - Planters sell their product to middlemen at a Bangkok market, in order to distribute to retailers, consumers, and processing factories in Bangkok and nearby provinces.

Figure 1 : The System of Lichee Market Distribution.



From the study, we find that small planters like to sell their fruit to wholesalers in Bangkok and local middlemen, by contracting for the sale price 1 to 3 months before the harvest time. But big planters will sell their fruit to wholesalers in Bangkok. Some planters will collect lichees from local middlemen, and sell to retailers, exporters, processing factories in Bangkok, and consumers.

Fresh lichee market channels from planters to retailers, agents, and processing factories, are the following:

- First, 85.57% of planters sell their fruit directly to collectors at the plantation; 9.36% sell their fruit directly to local retailers. Beside these, 0.80% sell lichees to local brokers. Moreover, 0.18% distribute lichees to local processing factories. Finally, 2.09% of planters transfer their fruit directly to consumers.

Of merchandisers, 10.96% will sell their fruit to local retailers; 63.74% will transfer lichees to brokers in Bangkok. Another 9.58% distribute lichees to processing factories. Finally, 3.29% sell their fruit directly to consumers. Of brokers in Bangkok (“yong”), 35.51% will sell their fresh lichees to wholesalers and retailers in Bangkok; and 3.29% of the lichees will be distributed to processing factories. Finally, 35.51% of wholesalers and retailers in Bangkok will transfer their fresh lichees to consumers. Exporters will also send their cold storage trucks to buy fresh lichees at plantations.

The lichee market channels/delivery discussed above are shown in Figure 1.

#### 4. Market Margin And Efficiency

Table 15 show Hong Hoi lichee market margin, planters’ share, and wholesale and retail market efficiency from 1987 to 1988. From the Table, the market margin for 1987 was higher than the margin for 1988, because the planters’ price in 1987 was less than the price in 1988. We can also see that retail market margin in 1987 and 1988 were higher than wholesale market margins. In addition, the planters’ share in 1988 was higher than in 1987, because the planters’ price in 1988 was higher than the price in 1987. We note that wholesale market efficiency was higher than retail market efficiency, because

there was less difference between wholesale price and planters' price than between retail price and planters' price.

**Table 16** illustrates Oheia lichee market margin, planters' share, and wholesale and retail market efficiency in 1986. From the Table, we can see that the retail market margin was higher than the wholesale market margin, because the difference between retail price and wholesale price is more than the difference between wholesale price and planters' price. Moreover the Oheia lichee market margin was 18 baht/kg. Also, the planters' share was 64%, higher than the percentage of wholesale or retail market margins. We find that wholesale market efficiency was higher than retail market efficiency, because there was less difference between wholesale price and planters' price than between retail and planters' price.

## **5. Export Value And Trends**

The export volume of lichee is not large, because the volume of production is small, and the price is high. However, **Table 17** illustrates fresh lichee imports and exports from 1984 to 1986; and of canned lichee in syrup from 1981 to 1986. In 1984, the export volume of fresh lichee was approximately 558.60 tons, or about 20.86 million baht. Then, in 1985, the export volume decreased to 183.66 tons, or nearly 6.55 million baht, because of the decline in production. The majority of exports were sold to Singapore, Malaysia and Hong Kong, about 87% of total exports. Singapore imported the largest volume of fresh lichee from Thailand, approximately 61% of the total export volume in 1985. In 1986, the export volume of fresh lichee increased to 1,460 tons, or nearly 34.24 million baht.

The export volume of lichee in syrup was also not large, from 15.27 tons, or 0.57 million baht in 1981, decreasing to 0.57 tons, or 28,045 baht in 1983. However, the export volume began to increase again in 1984, 1985 and especially in 1986, when the export volumes were 5.61, 2.92 and 474 tons respectively. The major foreign market for the product in 1981 was the U.S.A., and in 1982 West Germany. Later, in 1984 and 1985, export began to Saudi Arabia, Iraq and Finland.

Table 15: "Hong Houi" Lichee Market Margin, Planters' Share, Wholesale and Retail Market Efficiency from 1987 to 1988.

Year	Retail Price (Baht/kg.) (1)	Wholesale Price (Baht/kg.) (2)	Planters' Price (Baht/kg.) (2)	Market Margin (1)-(3)	Percentage of Market Margin		Planters' Share (3) × 100/(1)	Market Efficiency	
					Wholesale Market [(2)-(3)] × 100/(1)	Retail Market [(1)-(2)] × 100/(1)		Wholesale Market (2) × 100/ (2)-(3)	Retail Market (1) × 100/ (1)-(3)
1987	40	26	19.44	20.56	16.4	35	48.60	396.34	194.55
1988	40	33.50	29.80	10.20	9.25	16.25	74.50	905.41	392.16

Source: Price Level Division, The Department of Business Commerce.

Table 16: "Oheia" Lichee Market Margin, Planters' Share, Wholesale and Retail Market Efficiency from 1986.

Year	Retail Price (Baht/kg.) (1)	Wholesale Price (Baht/kg.) (2)	Planters' Price (Baht/kg.) (2)	Market Margin (1)-(3)	Percentage of Market Margin		Planters' Share (3) × 100/(1)	Market Efficiency	
					Wholesale Market [(2)-(3)] × 100/(1)	Retail Market [(1)-(2)] × 100/(1)		Wholesale Market (2) × 100/ (2)-(3)	Retail Market (1) × 100/ (1)-(3)
1987	50	37.50	32.00	18	11	33.33	64	681.82	277.78

Source: Price Level Division, The Department of Business Commerce.

**Table 17: Fresh Lichee Import and Export from 1984 to 1986; and Canned Lichee in Syrup Import and Export from 1981 to 1986.**

*Volume : Kgs.*

*Value : Baht*

Type of product	Import		Export	
	Volume	Value	Volume	Value
<b>Fresh Lichee</b>				
• 1984	11,240	730,608	558,602	20,862,528
• 1985	38,270	2,506,116	183,659	6,548,704
• 1986	-	-	1,459,900	34,241,000
<b>Lichee Canned in Syrup</b>				
• 1981	6,810	150,000	15,267	567,113
• 1982	1,722	45,579,	12,055	437,884
• 1983	5,436	125,802	574	28,045
• 1984	2,727	58,726	5,605	191,112
• 1985	5,444	125,263	2,922	150,126
• 1986	-	-	474,000	15,700,000

*Source: The Customs Department and Commercial Statistics Center,  
The Department of Business Commerce.*

Fresh lichees were also imported in 1984 and 1985, approximately 11.24 and 38.27 tons from China, or about 98% and 83% of total imports in 1984 and 1985. In 1984 and 1985, canned lichee in syrup was exported to about 2.27 tons and 5.44 tons, respectively. From 1981 to 1984 the total import came from Taiwan. But in 1985 the product was imported from China (see Table 17).





Table 18: (Cont.)

Country	1984		1985		1986		1987		1988 (Jan - June)	
	Volume	Value	Volume	Value	Volume	Value	Volume	Value	Volume	Value
Austria	65	2,717	600	15,390	-	-	-	-	-	-
France	600	24,380	1,200	27,000	2,500	68,800	7,400	249,500	10,400	354,800
West Germany	60	4,800	700	17,500	-	-	-	-	-	-
Italy	1,875	65,650	-	-	-	-	-	-	-	-
Netherlands	660	28,029	-	-	11,300	258,200	13,200	484,200	13,400	399,100
England	1,421	55,460	5,550	175,360	8,300	206,700	36,400	897,000	62,100	1,660,000
Canada	1,216	42,169	10,064	386,173	3,600	95,100	25,700	505,900	19,300	463,600
Kuwait	-	-	900	27,000	-	-	-	-	-	-
Oman	-	-	60	4,941	-	-	-	-	-	-
Qatar	-	-	563	15,390	-	-	-	-	-	-
Belgium	-	-	1,100	27,400	-	-	-	-	-	-
Switzerland	-	-	225	20,647	-	-	-	-	-	-
Australia	-	-	1,800	53,325	2,700	86,400	2,600	96,000	4,800	110,200
U.S.A.	-	-	23	3,305	-	-	-	-	-	-
Denmark	-	-	-	-	1,500	66,300	1,200	72,900	5,400	323,700
Others	-	-	-	-	9,100	266,400	36,400	1,332,100	25,800	988,100

Volume : Kgs.

Value : Baht

## 6. Major Importing and Exporting Countries

Table 18 illustrates the volume and value of fresh lichee imports and exports from and to each country from 1984 to 1988. From the Table, Thai imports of fresh lichee from China were approximately 750.2 tons, or 16.8 million baht. The volume and value decreased from the previous period of 1987, by about 46.1% and 49.2%, respectively. Major export countries for Thailand are Singapore, Hong Kong and Malaysia. The total export value to these countries is nearly 75% of total fresh lichee export. Besides, we have also other foreign markets, for example, in England, Australia, and France.

Table 19 shows volume and value of lichee in syrup imported and exported to and from each country from 1981 to 1985. From the Table, from 1981 to 1984, Thailand imported lichee in syrup from Taiwan. The volume of import fluctuated every year. In 1984, the import volume was nearly 2.73 tons, or 58,796 baht. But, in 1985, the product was imported wholly from China, approximately 5.44 tons, or 125,263 baht.

We note that the export volume of lichee in syrup also varies every year. In 1985, the volume decreased nearly 1.92 times from 1984. The value was about 150,126 baht, or 2.92 tons. Most of the Thai foreign market is in Finland, Saudi Arabia, Iraq and the U.S.A.

We will now describe some foreign markets in detail, as follows:

### 6.1 Foreign Markets

#### a) Singapore

First, Singapore imports a small volume of fresh lichee from Thailand, when compared to other countries. We find that during 1983 and 1986 the majority of fresh lichee for Singapore was imported from Taiwan (see Table 20). But, in 1987, Singapore imported the highest volume of lichees from Thailand, approximately 801 tons, or 1,052 thousand Singapore dollars. This was nearly 1.76 greater in volume than from Taiwan in the same period, and 0.75 times in value. We can note that Singapore imported more fresh lichee from Thailand than from Taiwan in 1987, because the Thai fresh lichee had a lower price. Singapore

also exports a small volume of fresh lichee to Malaysia, Brunei, Sabar, Sarawak, England, and Australia.

*b) European Community*

The European Community needs fresh lichees of large size, with small seeds, a sufficiently dry pulp, without insects, and of consistent size in one box. In 1987, England, West Germany, and the Netherlands imported fresh lichee from Thailand, approximately 3.2 million baht. They also imported canned lichee in syrup, to about 5.5 million baht. Moreover the Community decreased its import tax for Thailand from 24% to 12-15%.

*c) The U.S.A.*

The U.S.A. imports a small volume of fresh lichee from Thailand, approximately 0.5 million baht in 1987. Every foodstuff exported to the U.S.A. must be controlled by the Food and Drug Administration, or USFDA, under the Public Health Service, the US Department of Health, Education and Welfare. Normally, the U.S.A. interdicts the import of every kind of fresh fruit and vegetable. But, it will agree to import if there is a formal request to the U.S.A. with submission of samples of the goods for inspection in advance. After that, the U.S.A. will investigate the samples for plant diseases and insects over two years. If there is no problem, it will permanently permit import to the U.S.A. Thailand has not at present made any formal request; but there are statistics for export of fresh fruit and vegetables to the U.S.A., because Thailand exports them in combination with other goods, and the U.S.A. officials allow this. Moreover, the U.S.A. allows a tax free rate for import of every kind of fruit and vegetables.

*d) Australia*

Finally, Australia has begun to get to know Thai lichees. Lichees imported by Australia must pass an inspection for plant diseases at the airport or harbor. Australian officials will pass lichees after fumigation with ethylene dibromide (EDB) at  $16 \text{ g/m}^3$  for 2 hours at 21 C. or above, with maximum chamber load of 50%. If, they find that there are no dangerous plant diseases or insects, they will allow them for import. In addition, Australia also allows a tax free rate for fresh fruit imports.

Table 19: The Volume and Value of Lichee in Syrup Import and Export from and to Each Country from 1981 to 1985.

Country	1981		1982		1983		1984		1985	
	Volume	Value	Volume	Value	Volume	Value	Volume	Value	Volume	Value
Import	6,810	150,000	1,722	45,579	5,436	125,802	2,727	58,796	5,444	125,263
China	6,810	150,000	1,722	45,579	5,436	125,802	2,727	58,796	-	-
Taiwan	-	-	-	-	-	-	-	-	5,444	125,263
Export	15,267	567,113	12,055	437,884	574	28,045	5,605	191,112	2,922	150,126
Jordan	-	-	678	35,496	10	1,149	-	-	-	-
Laos	99	5,448	216	10,800	158	9,840	-	-	-	-
Sweden	-	-	-	-	67	1,357	-	-	-	-
Australia	-	-	-	-	339	15,699	-	-	-	-
Saudi Arabia	1,017	22,168	1,356	62,033	-	-	1,356	58,816	678	30,061
West Germany	-	-	9,534	317,055	-	-	-	-	-	-
U.S.A.	14,015	525,441	271	12,500	-	-	4,068	117,103	406	12,024
Canada	136	14,056	-	-	-	-	-	-	-	-
Japan	-	-	-	-	-	-	17	1,099	-	-
Sri Lanka	-	-	-	-	-	-	164	14,094	136	4,294
Iraq	-	-	-	-	-	-	-	-	420	43,802
Denmark	-	-	-	-	-	-	-	-	27	1,417
Finland	-	-	-	-	-	-	-	-	768	33,993
Mali	-	-	-	-	-	-	-	-	215	6,985
Others	-	-	-	-	-	-	-	-	272	17,550

Volume : Kgs.

Value : Baht

**Table 20: The Volume and Value of Fresh Lichee Import and Export to and from Singapore During 1983 and 1987.**

Volume : tons  
Value : thousand  
Singapore Dollars.

Year	Country	Import		Export	
		Volume	Value	Volume	Value
1983	Australia	7	26	-	-
	China	128	1,252	-	-
	Hong Kong	6	60	-	-
	Malaysia	35	28	412	871
	Sarawak	-	-	9	33
	Taiwan	3,943	9,498	-	-
	Thailand	253	1,062	-	-
	U.S.A.	27	65	-	-
	Others	-	-	12	39
	Total	4,398	11,991	433	944
1984	China	99	732	-	-
	Brunei	-	-	42	168
	Malaysia	50	46	905	1,822
	Sabar	-	-	13	53
	Sarawak	-	-	22	72
	Taiwan	17,423	11,469	-	-
	Thailand	453	1,653	-	-
	England	-	-	13	75
	Others	4	26	2	7
	Total	18,030	13,926	997	2,197

Table 20: (Cont.)

Volume : tons  
Value : thousand  
Singapore Dollars.

Year	Country	Import		Export	
		Volume	Value	Volume	Value
1985	China	55	508	-	-
	Brunei	-	-	144	408
	Malaysia	-	-	451	990
	Sabar	-	-	13	39
	Sarawak	-	-	37	120
	Taiwan	21,419	8,552	-	-
	Thailand	161	519	-	-
	Total	21,757	9,593	-	-
1986	Australia	-	-	12	70
	Brunei	-	-	167	406
	China	127	664	-	-
	Malaysia	104	62	490	996
	Taiwan	3,550	7,630	-	-
	Thailand	296	446	-	-
	Others	-	-	5	33
	Total	4,077	8,807	674	1,506
1987	Australia	-	-	9	54
	Brunei	-	-	46	160
	China	43	307	-	-
	Malaysia	18	32	90	257
	Taiwan	454	1,396	-	-
	Thailand	801	1,052	5	56
	Total	1,319	2,804	150	528

Source: The Customs Department and Commercial Statistics Center,  
The Department of Business Commerce.

**6.2 Potential Exporting Country: Australia**

Now, Australians are trying to grow lichee plants at Darwin in the Northern Territory of their country. Their lichee fruits are large, but have small seeds like Taiwan lichees. It is expected that Australia may export lichee fruit in the next ten years. However, April to May is the off season period for Australian lichees. The season is during May and February. Australia can at present produce less lichees than will meet the domestic demand. If Thailand can coordinate with Australia in order to find new methods for eradicating plant diseases and insects, it is expected that Australia will become a new fresh fruit market for Thailand.



## PROBLEMS AND RECOMMENDATIONS

### 1. Production Problems

The production of lichee faces several problems, as follows:

a) First, there is the problem of lack of high quality lichee types that give fruit consistently, correspond to market demands and to each plantation region, and can withstand plant diseases and insects.

b) Planters also do not know how to control the volume of production and lack pretreatment knowledge. Lichee fruiting very much depends on the climate situation. In 1987, total production decreased 40% because Hong Houi lichee produced leaves instead of flowers, since it rained during the time of sprouting new branches. In addition, the flowers of Oheia and Kimjeng lichee fell during March and April, because the weather was rather hot.

c) In addition, planters have not joined in groups in order to sell their fruit and to obtain purchase orders in advance in order to prepare future production plans.

d) Furthermore, there is the problem of lack of a good standard for packaging. Some planters use bamboo baskets to hold lichees. Thus many lichees are damaged during transport.

e) Moreover, there is no method to control temperature during transport and sale. Thus the quality declines very quickly.

f) Also the majority of lichee production is consumed by the domestic market. Thus, the quality does not correspond to foreign market demands.

g) Finally, Thailand has no good means for keeping good lichee strains in the country. Thus, foreigners can take the best strains to grow in their own countries.

### 2. Marketing Problems

There are two marketing problems, as follows:

a) First, there is the problem of lack of marketing information on lichee quality, volume, price and tastes for each country. Thus, it is difficult to prepare

production and export plans, because this depends on price fluctuations in preceding years, and climate conditions.

b) Finally, the majority of plantations are in the North, which is far from the central markets in Bangkok. Therefore, the transport cost is high. This effects a rise in sale price.

### **3. Processing Problems**

Lichee processing problems are illustrated as follows:

a) Processing cost is high, because cans must be imported from abroad. The import tax is also high. Besides which, the volume and quality of raw material are inconsistent.

b) Furthermore, there is a shortage of labor, including skilled labor, because processing factories are labor intensive. The labor cost of a processing system is approximately 5% of total cost.

c) Moreover, several processing factories face electricity and water supply problems. Electricity and water supply failure causes a stoppage in production. Then fresh raw materials are damaged and their quality declines. This results in a low quality processed fruit. Besides, the progressive price rate of water supply very much effects the fruit processing industry. If there is high production, the water and electricity costs will multiply. This is contrary to the principle that the unit cost of production should decline when the volume of production augments.

d) In addition, the majority of fruit processing factories are small and medium sized. They apply old technology. This causes a high cost of production, and their product quality does not meet market demand.

e) Finally, many small fruit processing factories have no laboratory for assaying the quality of their product. Otherwise, they possess a laboratory, but there is no worker qualified to develop their product according to foreign market demands and tastes. However, there are also some large fruit processing factories which have a capital of more than 100 million baht and meet world standards.

### **4. Export Problems**

Export problems are the following:

a) First, there is a lack of any marketing organization in Thailand to determine necessary export criteria, export price and quality control, and to consistently supply product according to foreign contracts. The majority of export is in the form of consignments.

b) Second, Thai exporters do not grade lichee for quality before export. When they buy lichee from planters or the wholesale market, they have no experience to determine exactly the volumes of good and bad grades. Thus, they only find that there is a small volume of good grade after grading. The remaining larger volume is not good. Finally, they export the total amount, because they have limited time for storing fresh fruit. This destroys the image of Thai fruit.

c) Third, exporters face a problem of lack of containers for export.

d) Finally, in the Hong Kong market, Thai exporters must be responsible for the transport costs from Hong Kong airport to wholesale markets in Hong Kong Island and Kowloon, as follows:

- Airport customs duty: 0.51 Hong Kong Dollar/kg., according to the weight in the air waybill.
- Air waybill cost: 3.00 Hong Kong Dollars per bill.
- Transfer cost from the airplane to a truck: 3.00 Hong Kong Dollars/ basket, or per round crate, or per box.
- Labor cost for removing lichees from the truck: 3.00 Hong Kong Dollars/ basket, if the weight is less than 40 kgs. But the cost will be 4.00 Hong Kong Dollars/ basket, if the weight is more than 40 kgs.
- Truck hire from Hong Kong airport to :
  - Hong Kong Island: 180 Hong Kong Dollars/time.
  - Kowloon: 130 Hong Kong Dollars/time.
- Customs fee: 20 Hong Kong Dollars/Air waybill
- Miscellaneous expenses such as long distance telephone charges, telefax, teleprinter, and reports on price movements, etc.

Thus, when exporters wish to sell their product to Hong Kong, they must calculate these additional costs to establish their export price.

## 5. Recommendations

Finally, we propose the following recommendations:

a) First, exporters should coordinate with the private sector having purchasing power, in Singapore, in order to sell Thai fruit, and to organize a fruit week in Singapore.

b) Also the Thai government should establish export areas for fresh fruit and vegetables, by determining the following criteria:

- Selling by bid in the area, and possessing a plant quarantine certificate;
- Packaging should correspond to foreign market demands; and
- Finally, the centre for export may be situated at the See Mum Mueng wholesale market, with the support of the Internal Commerce Department.

c) In addition, the government should create a centre for processed fruit quality inspection, in order to certify the quality of products. Moreover, we can allott the Department of Commercial Relations or the Bureau of Industrial Food Processing Associations, as a centre for the following responsibilities:

- Certify the inspection of industrial agricultural products for export;
- Receive applications for food registration in order to send these to the Committee of Food and Drugs for further consideration; and
- Finally, the centre must constantly inspect registered factories for their production, methods of maintenance, and the quality standards of product, accepted by foreign markets.

d) Regarding Thai fruit public relations, Thailand's foreign bureau of commercial consulting should promote and create an image for Thai fruit abroad, by:

- Submitting Thai fruit to pass foreign market tests;
- Advertising Thai fruit in foreign journals;
- Providing Thai fruit to airline passengers; and

- Finally, the Thai Airway International Company can sell Thai fruit at the tax free shop at the airport, by packing them in an appropriate size of package to be easily carried by hand, and displaying a plant quarantine certificate.

e) Regarding the domestic market, planters should organize in a group for operating their production and marketing. The group can supply manure, fertilizer and pesticides, with finance for marketing and production by their members. Finally, they should sell their product as a group in order to have high price negotiating power with middlemen.

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