Report on the Development of

The Thai Rubberwood Industry

Promotion of the Thai Rubberwood Industry in the Years 2002-2005

By

Forest Management and Forest Products Research Office

Royal Forest Department Ministry of Natural Resources and Environment

ITTO Project : PD 51/00 Rev.2 (I,M)

Improvement of Rubberwood Utilization and Marketing in Thailand

In collaboration with

Department of Industrail Promotion

Department of Export Promotion

The Thai Parawood Association

The Thai Furniture Industry Association

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Department of Industrial Promotion and Its Support of the Rubberwood Industry

Introduction

Thailand has a rubber plantation area of more than 12.3 million rais (1.96 million hectares), and is second only to Indonesia (Indonesia has a plantation area of approximately 15 million rais, Thailand approximately 12 million rais, Malaysia has approximately 10 million rais). Most of the planted areas are in the Southern and Eastern Regions. Particularly, the 14 Southern Provinces of Thailand from Chumporn Province down to the adjacent of Malaysian border comprise most of the rubberwood plantation areas, accounting for 85.3 percents of the rubber plantation areas of the whole country. The rest are plantating in the Northeastern and Northern Regions, the former in which the government is currently promoting rubber cultivation and expects to become an important rubber production center in the future. Thailand is currently the number one natural rubber exporter of the world. The rubberwood is deemed as a byproduct from the expended rubber trees too old to harvest the natural rubber latex. When the rubber trees are approximately 20-25 years old, their rubber output would diminish to a point not worthing the investment, so they are cut down and replaced by new hybrids. From the past in which the felled trees were used as fuel and converted to charcoal, various products have been developed both for the domestic use and for export to foreign countries.

Products made from the rubberwood include :

1. Furniture such as tables, chairs, dining room collections, living room collections
2. Household utensils, kitchen wares, shelves, picture frames
3. Toys
4. Construction piles
5. Spools for winding electrical cables
6. Crates and pallets for merchandise support
7. Particle boards, medium density fiber (MDF) boards

The rubberwood has been used to make furniture in Thailand for over 30 years, most of the production being for export. Due to the market demand and the deficiency of other types of wood, the use of rubberwood in furniture production is currently increasing. As to the suitability of using rubberwood in furniture production. It can be seen that :

1. Availability of the wood

When the rubberwood are 20-30 years old, since they provide small quantities of rubber latex, the plantation owners will fell them down in order to grow a new crops. Thus, more than 300,000 rais of rubber plantations will be felled down every year, amounting to approximately 8 million cubic meters of wood.

2. Characteristics of the Wood

The natural color of rubberwood is white with a pale yellow tint or cream tint. If sawn across the radius, the wood grain would be visible. It is thus suitable for use in the production of furniture, both naturally colored and dyed.

3. Weight and Strength

If the rubberwood is compared to teak, it will be found that they are wood in the same group, having intermediate weights and strengths.

4. Properties Related to Drying, Shrinkage and Shape Retention in Service

From the wood drying data of the kiln dry factories, it is found that the drying of rubberwood 2 inch thick will take approximately 10-12 days, which is faster than drying teak by approximately 2 times. Spilt damages from drying are few, except the wood containing cross grains will have many split damages. The radial and tangential shrinkages of rubberwood are close to those of teak, but its longitudinal shrinkage along the tracheids is higher than normal, amounting to 0.9-1.1%. Correct stacking procedure and the use of pressing weights during drying can be reduced the damages from warping. The shape retention in service of rubberwood is at a satisfactory level.

5. Machining Ability

The rubberwood is a wood of intermediate hardness. It can be processed, sawn or planed with ease.

As for the problems of the rubberwood which has been so-called "trouble wood", the rubberwood furniture factories must take into account that :

1. After cutting down, rubberwood will be susceptible to borer insect or fungus attack, and must be immediately processed and preserved by treating or impregnating with a chemical solution and drying. All rubberwood products should be used in a dry place, in no contact with water or high humidity.

2. Rubberwood is prone to distort, warp, and contains of many knots. It should be used in short sections. If a long or broad-faced piece is required, jointing should be made using glue.

3. In saw cutting, slicing, drilling, carving, if the blade is not sharp, or the sanding is severe, defects may be created on the surface of wood.

4. Rubberwood contains wood rays in certain areas, rendering smooth planning difficult and sanding time-consuming. Due to the uneven dye absorption, dyeing is also difficult. Producing round pieces by milling can reduce the pulverized splinters.

5. The availability of felled rubber trees will be reduced in the rainy season since logging is difficult.

The Furniture Industry Factories

According to the factory registration data of the Department of Industrial Factories, on January 27, 2005, there were 562 factories engaged in the processing and drying/chemical impregnating and manufacturing of wood planks and board from rubberwood, 987 factories engaged in the manufacturing of wood products, such as carved-wood picture frames, kitchen wares, wood crates, electrical cable spools, toys, household decorative items from wood (Category 36), and 2, 596 furniture industry factories engaged in the manufacturing of furniture from wood, metal, vine, hide, and others (Category 37), with a combined investment of 22,666 million bahts, labor force of 87,832 personal. The detailed distribution of the furniture plants situated in the various Regions is as follows : The area which has the highest concentration of these factories is Bangkok and Vicinity, with 886 plants, accounting for 34.13 percents. These plants are aggregated into the various parts of Bangkok such as Bang Pho, Saparn Dam, Chatuchak Park, Samut Sakorn, Patum Thani, Nonta Buri, and Samut Prakarn. Second is the Northeastern Region with 449 plants, which account on 17.30 percents. The important manufacturing centers are located in the principle provincial cities such as Khon Kaen, Nakhon Ratchasima, Ubon Ratchathani, Udon Thani, and Roi Et. The Northern Region has 436 factories, which account for 16.80 percents. The North has long been known as a furniture manufacturing center of the from with unique identity. The provincial manufacturing centers include Chiang Mai, Lampang, Lampoon, Phrae and Pitsanulok. The Central Region has a total number of 374 plants, which account for 14.40 percents. The important manufacturing centers include Nakhon Sawan, Phetburi, Ratchaburi, and Prachinburi. The Southern Region, which is active in the manufacture of furniture from rubberwood, has 260 plants, accounting for 10.02 percents. The important manufacturing centers include Surat Thani, Songkhla. The Eastern Region is another important manufacturing center of furniture from rubberwood, with most of the plants located in Chonburi, Rayong and Chachoengsao.

Table 4 The Number of Furniture plants, Category 37, Classified by Region in 2005

Region	Number	Percentage
Bangkok and Vicinity	886	34.13
Northeastern Region	449	17.30
Northern Region	436	16.80
Central Region	374	14.40
Southern Region	260	10.02
Eastern Region	191	7.35
Total	**2,596**	**100**

Source : Department of Industrial Factories, Ministry of Industry, January 27, 2005

The Production Situation

The rubberwood industry is an industry associated with several hundred thousands of people, has an output value in the entire system of over 70 thousand million bahts, and consists of 3 groups of related parties, i.e., the upstream industry which comprises the group of agriculturers who cultivate the rubber trees, the middlestream industry which comprises the group of rubberwood processing enterprises, and the downstream industry which comprises the group of furniture and products from rubberwood. In the furniture and products from rubberwood industry, approximately 80 percents of the production are for export, and the surplus production of processed wood is also exported to the foreign countries such as China, Japan, Taiwan, etc.

On the world market, the merchandise of wood furniture and products has a trading value of over 8 trillion bahts, with 70 percents of the consumers residing in the OECD countries, namely, the U.S., Japan, Canada and Europe. Thailand and the South East Asian countries are considered as the big furniture producers, with little consumption and large export. There are approximately 2,800 wood furniture and products manufacturing plants in Thailand, and more than 650 plants are producing furniture for export. Most of the manufacturers are small and medium industrial plants (SMEs). The production capacity of the wood furniture and products plants in Thailand is approximately 100,000 million bahts per year, of which approximately 57,000 million bahts/year are exported and approximately 43,000 million bahts/year domestically consumed. The growth rate of export in 2004 was 12.67 percents.

Most of the technology for manufacturing woodworks in Thailand still relies on the basic machineries which are either old machines or domestically produced machines, whereas the high performance machines are imported from Germany, Japan, Italy. High technology plants constitute approximately 25 percents of all the plants. The furniture industry is a labor intensive industry. Currently, even though Thailand has the skilled labor, there is still a need for personnel development among the unskillful labor, as well as a continuous dissemination of knowledge and new experiences to the labor, especially regarding the furniture industrial design which must be improved from the present.

The furniture which are manufactured can be divided into 2 types, namely :

- Stable Furniture or Furnished Furniture

These are ready-made furniture which can be immediately put to use. Most of the production is for serving the domestic market demand.

- Knock Down Furniture

These are furniture in which the various parts can be removed and re-assembled. Most of the production is for export. Since the transportation space is saved, the cost can be reduced.

Cost Structure of the Furniture Industry*

Raw material cost	38	percents
Labor cost	10	percents
Overhead cost	52	percents

(***Source** : Productivity Improvement Institute of Thailand, 1999.)

The characteristic of furniture production for export can be divided into 3 types, namely :

1. Original Equipment Manufacturing (OEM)

This is a hired manufacturing according to the client's designated products.

2. Original Design Manufacturing (ODM)

This is a manufacturing in which the manufacturer provides his own design.

3. Original Brand Manufacturing (OBM)

This is a manufacture of merchandise with his own brand name.

More than 80 percents of the furniture production in Thailand are hired manufacturing according to the client's designated products, with the clients providing the designs or samples. Second is the manufacturing in which the manufacturing plants provide their own designs. The designs available on the market might be modified and presented to the clients.

Currently, most of the processed rubberwood is used in furniture manufacturing. Lesser amounts are used in the particleboard industry, the toys industry, and etc. Thus, the growth of processed rubberwood usage would depend on its use in the furniture industry. From the examination of the average growth of the processed rubberwood usage demand and the trend of the wood furniture export, which expand in the same direction, it is expected that the demand volume in the future should increase by approximately 10 percents. Thus, it is expected that in the year 2005, export volume would increase from the year 2004 to a value of approximately 70,000 million bahts, and the total processed rubberwood usage would be approximately 1,941,143.8 cubic meters (for furniture, 1,106,451.9 cubic meters, for particleboards 834,691.9 cubic meters). However, when said volume of wood is put into production, there will be losses, which would be put to use again in other industries, such as toys, toothpicks, icecream sticks. Even the particleboard production can employ these losses. (The volume of the wood is calculated from the wood furniture and products export value 70% of which are rubberwood products 35% of which are the rubberwood raw materials / the price of the processed rubberwood per cubic meter.)

Besides the rubberwood which is the main raw material in furniture production, other raw materials are also employed, including fittings, adhesives, sandpapers, lacquers, thinners, and paints, both domestically produced and those that must be imported. High quality merchandises must come from sound wood raw material and high quality auxiliary raw materials.

The Selling Price of Processed Rubberwood

According to the middle price data of the processed, chemical impregnated, and dried rubberwood from the Thai Parawood Association in April 2005, the price of processed, chemical impregnated, and dried rubberwood would be different depending on their size and thickness. The smallest size with the lowest price is 7/8 inch x 7/8 inch x 1.00 - 1.10 meters, whereas the largest size with the most expensive price is $2\ ^1/_2$ inches x $2\ ^1/_2$ inches x 1.00 - 1.10 meters.

The ex-factory price of processed rubberwood would be between 150-250 bahts per cubic foot or approximately 5,151-8,835 bahts per cubic meter.

The export price of processed rubberwood to Malaysia was between 167-257 bahts per cubic foot, to Hong Kong 185-275 bahts per cubic foot, to China (YANTIAN) 187-277 bahts per cubic foot and (SANTIAN) 194-284 bahts per cubic foot, excluding the ocean freight charge (OFC).

The Middle Price of Processed Rubberwood

No.	SIZE(TxWxL) (INCHxINCHxMETER)	UNIT PRICE USD/M^3 AB-GRADE ONLY							
		EX-FAC (BATH/CU.FT)	EX-FAC (USD/M^3)	FOB (1 x 40' FCL)			CIF (1 x 40' FCL)		
				BANGKOK	SONGKHLA	MALAYSIA	HONGKONG	YANTIAN	SANTIAN
1	2 1/2 x 2 1/2 x 1.00 - 1.10	250	227	255	250	257	275	277	284
2	2 x 2 x 1.00 - 1.10	230	209	237	232	239	257	259	266
3	2 x 2 1/2 , 3 , 4 x 1.00 - 1.10	235	214	242	237	244	262	264	271
4	1 1/2 x 2 x 1.00-1.10	220	200	228	223	230	248	250	257
5	1 1/2 x 2 1/2 , 3 , 4 x 1.00-1.10	230	209	237	232	239	257	259	266
6	1 1/4 x 2 1/2 x 1.00-1.10	220	200	228	223	230	248	250	257
7	1 1/4 x 2 1/2 , 3 , 4 x 1.00-1.10	230	209	237	232	239	257	259	266
8	1 x 2 x 1.00-1.10	215	196	224	219	226	244	246	253
9	1 x 2 1/2 , 3 , 4 x 1.00-1.10	225	205	233	228	235	253	255	262
10	7/8 x 2 x 1.00-1.10	215	196	224	219	226	244	246	253
11	7/8 x 2 1/2 ,3 , 4 x 1.00-1.10	225	205	233	228	235	253	255	262
12	6/8 x ,3 , 4 x 1.00-1.10	225	205	233	228	235	253	255	262
13	1/2 x 2 ,3 , 4 x 1.00-1.10	200	182	210	205	212	230	232	239
14	1 1/2 x 1 1/2 x 1.00-1.10	215	196	224	219	226	244	246	253
15	1 1/4 x 1 1/4 x 1.00-1.10	200	182	210	205	212	230	232	239
16	1 x 1 x 1.00-1.10	150	137	165	160	137	185	187	194
17	7/8 x 7/8 x 1.00-1.10	150	137	165	160	136	185	187	194

Source : The Thai Parawood Association (prices for the month of April, 2005)

OUR PRICE LIST MENTIONED ABOVE IS BASE ON THE FOLLOWING :

1) THE PRICES MENTIONED ABOVE ARE SUBJECT TO CHANGE DUE TO THE EXCHANGE RATE & OCEAN FREIGH CHARGE TO OUR NOTICE

2) EXTRA SIZE THICKNESS/WIDTH = +3 MM. (1/8 INCH), LENGTH = +20 MM.

3) MOISTURE CONTENT IS MAXIMUM 12%

4) COMMODITY GRADE IS REFERED TO THE THE "THAI PARAWOOD ASSOCIATION" (TPA) SPECIFICATION

5) THE PRICE WILL BE HIGHER BY 5-10 USD/M3 FOR LONGER LENGTH EQ. 1.25,1.3 METER.

6) THE FOB AND CIF PRICES ARE SUBJECTED TO CHANGE ACCORDING TO THE TRANSPORTATION COST AND EXPORT TAX CONDITIONS.

Currently, large amounts of rubberwood are exported in the year 2004, with the value of 9,360.59 million bahts and volume 1,168,310.73 cubic meters. In the year 2005, the export value (Jan.-Apr.) amounted to 3,916.82 million bahts and volume 394,768.18 cubic meters. The growth rate of the export volume from the same period of the previous year was 12.03 percents. Most of the rubberwood went to China, with an export volume growth rate of 23.81 percents. The country which had imported the rubberwood from Thailand at the greatest increasing rate in the period of Jan.-Apr., 2005, was Vietnam with an export volume growth rate from the same period of the previous year of 576.25 percents, which is considered very high. The import value was 157.68 million bahts, volume 18,148.44 cubic meters. But Japan, Hong Kong and Taiwan were importing less rubberwood from Thailand.

Table Showing the Exports of Processed Rubberwood

Volume : Cubic meters, Value : Million bahts

Countries	2001		2002		2003		2004 (Jan.-Apr.)		2005 (Jan.-Apr.)		% Increase '05/'04	
	volume	value	volume	value	volume	value	volume	value	volume	value	volume	value
China	380,368.69	2,627.01	573,879.35	4,422.50	815,972.11	6,465.41	242,829.01	2,132.19	300,637.44	2,513.65	23.81	17.89
Japan	4,101.82	2,627.01	3,090.60	47.80,1,2	2,872.56	42.17	1,056.64	11.57	316.15	643.35	-70.08	5460.50
Hong Kong	220,255.90	66.39	154,695.73	25.13	123,411.58	1,071.69	50,314.01	406.30	21.468.96	191.35	-57.33	-52.76
Taiwan	11,833.37	1,584.38	8,628.12	63.93	20,584.89	181.14	16,278.28	140.67	2,575.96	24.47	-84.18	-82.61
Vietnam	19,382.25	90.63	17,929.01	140.16	31,072.47	282.01	2,683.69	22.65	18,148.44	157.68	576.25	596.16
Malaysia	21,851.27	152.23	88,030	464.27	-	1,318.17	37,467.17	248.16	51.621.66	385.74	38.78	55.44
Germany	-	145.57	-	-	-	-	-	-	-	-	-	-
South Korea	115.36	-	-	-	-	-	-	-	-	-	-	-
Myanmar	961.44	1.19	-	-	-	-	-	-	-	-	-	-
Ireland	-	4.51	-	-	-	-	-	-	-	-	-	-
Others												
Total	660,143.45	4,680.54	846,581.09	6,366.21	1,168,310.73	9,360,5.9	352,376.82	2,972.96	394,768.18	3,916.82	12.03	31.75

Source : Department of Foreign Trade

The Marketing Situation

Approximately 80 percents of the furniture and other products from rubberwood are exported. It is estimated that this export amounts to a proportion of 70 percents of the total wood furniture export value each year, and each manufacturer is endeavoring to improve the design and quality in conformance with the individual market requirements. From the wood furniture and parts export value of 48,655.40 million baths in the year 2004, the furniture from rubberwood is approximately 34,058.78 million bahts. During the 1 st quarter from Jan.-Mar., 2005, Thailand had exported 11,433.80 million bahts of wood furniture and parts, an increase from the same period in the year 2004 of 2.33 percents, with the rubberwood furniture and products accounting for 8,003.66 million bahts. The largest export markets were still the main markets, that is, Japan, the U.S. and U.K. The growth rates increases, except the export to Japan had declined by 3.38 percents.

Japan Market

Japanese market is an important export market of the Thai furniture. In the past, Japan had imported wood from Thailand to produce furniture by themselves. But today, with the problem of high labor wages and production costs, Japan is importing the finished furniture which are cheaper than those domestically produced instead, and is importing the wood furniture from Thailand increasingly. In the year 2004, the value of the Thai furniture export to Japan was 12,784.50 million bahts, second only to the U.S. These are furniture produced by order of the client's designs (Original Equipment Manufacturing). Japanese market is considered a strict market regarding the merchandise quality. Thus, the furniture imported into Japan must be quality inspected for compliance with the standard levels and regulations.

The U.S Market

The U.S is another important market for Thailand. In the year 2004, Thailand had exported furniture to the U.S. market as much as 17,474.90 million bahts, amounting to a proportion of 35.91 percents of the Thai furniture and parts export value, the first ranking. But Thailand still has a very small share in the U.S. market.

The U.S. market is extremely price competitive, especially against China, Malaysia, Indonesia, and Vietnam which Thailand is at a cost disadvantage compared to these lower production cost competitors. In addition, the NAFTA trading congregation is making the U.S import more wood furniture and products from the countries within the group.

European Community Market

The European Communication is both a big furniture producer for export and furniture import of the world, but most of the trade is with each other in the group. The important furniture trading countries are the U.K., Germany, France, and Italy. The European Community market requires hardwood furniture of good quality and high price, but the furniture imported from ASEAN are mostly of rubberwood.

Thailands important market in the European Community is the U.K., which is an export market with bright prospects. Less important are Germany, France, the Netherlands. However, the Thai furniture market in European Community is very small, that is, less than 1 percent. The European Community market emphasizes both the quality along with the price, and is not as extremely price competitive as the U.S.

Table Showing the Exports of Wood Furniture and Products

Items	1999	2000	2001	2002	2003	2004	2005 (Jan.-Mar.)
1. Furniture and parts	30,144.90	36,605.6	38,445.90	41,255.4	43,192.60	48,655.40	11,433.80
1.1 Wooden furniture	17,615.3	21,542.3	22,382.3	24,036.2	24,343.40	27,643.20	5,941.10
1.2 Metal furniture	3,483.10	4,431.70	4,204.2	3,900.5	1,144.40	3,042.60	3,042.60
1.3 Mattresses, pillow, cushions	1,454.30	1,366.50	1,513.60	1,938.6	1,760.10	2,059.60	580.00
1.4 Other furniture	5,188.9	6,604.9	7,625.6	8,200.3	9,339.20	10,698.50	2,819.90
1.5 Furniture parts	2,403.20	2,660.4	2,720.1	3,179.7	4,329.60	5,221.50	1,407.70
2. Wood products	12,301.6	14,149	14,547.70	15,023.00	4,587.00	115,293.90	11,795.30
2.1 Utensils made of wood	3,574.30	4,466.30	4,561.4	4,915	4,630.90	4,367.50	8,779.60
2.2 Furnishings wood building parts	4,204.50	4,568.60	4,720.9	4,390	4,523.90	4,877.50	939.70
2.3 Picture frames	3,756.70	4,213.30	4,119.9	4,399.8	3,907.00	4,257.20	1,151.60
2.3 Carvings and decorations made of wood	766.10	900.80	1,145.5	1,318.2	1,525.30	1,791.70	924.40
Total (1+2)	**42,446.50**	**52,310.70**	**52,993.6**	**56,278.4**	**57,779.60**	**63,949.30**	**23,299.10**

Source : Commercial Economic Information Center, Department of Commercial Economy
(The Jan.-Mar.,2005, data are preliminary figures.)

Thailand's Furniture and Parts Export Markets

Items		Value : Million bahts					Growth rate : Percents				Proportion : Percents				
		2002	2003	2004	2004 (Jan.-Mar.)	2005 (Jan.-Mar.)	2002	2003	2004	2005 (Jan.-Mar.)	2002	2003	2004	2004 (Jan.-Mar.)	2005 (Jan.-Mar.)
1	Japan	12,794.90	13,231.20	12,784.50	3,285.70	3,376.70	-11.55	3.41	-3.38	2.77	30.63	26.27	29.41	29.53	30.63
2	U.S.A.	14,602.90	14,588.60	17,474.90	3,869.10	3,337.80	25.72	-0.1	19.78	-13.73	33.78	35.91	34.63	29.19	33.78
3	U.K.	3,244.60	3,733.40	4,773.00	1,164.30	1,325.00	32.76	15.07	27.85	13.8	8.64	9.81	10.42	11.59	8.64
4	Canada	1,705.70	1,806.90	1,806.70	437.7	318.3	30.1	5.93	3.48	-27.28	4.18	3.84	3.92	2.78	4.18
5	Australia	1,325.50	1,140.40	1,256.60	239.7	269.2	55.81	-13.96	10.19	12.31	2.64	2.58	2.15	2.35	2.64
6	Germany	699.8	911.1	987.7	230.7	200.6	-27.5	30.19	8.41	-13.05	2.11	2.03	2.06	1.75	2.11
7	Indonesia	56.2	126.9	407.3	36.7	185.4	102.89	125.8	220.96	405.18	0.29	0.84	0.33	1.62	0.29
8	The Netherlands	355.9	561.3	581.6	126.3	175.7	-8.41	57.71	3.62	39.11	1.3	1.2	1.13	1.54	1.3
9	Italy	472.8	541.7	134.2	156.7	15.49	15.12	14.57	16.77	1.09	1.11	1.2	1.37	1.09	
10	Spain	336.5	435.9	521	132.2	154.7	16.32	29.54	19.52	17.02	1.01	1.07	1.18	1.35	1.01
Total of 10 items		35,532.80	37,008.60	41,198.00	9,656.50	9,500.20	8.62	4.15	11.32	-1.62	86.17	85.68	84.66	86.43	83.09
Others		5,704.20	6,184.00	7,467.40	1,516.70	1,933.60	-0.5	8.41	20.75	27.5	13.83	14.32	15.34	13.57	16.91
Grand total		41,237.00	43,192.60	48,665.40	11,173.10	11,433.80	7.26	4.74	12.67	2.33	100	100	100	100	100

Source : Information and Communication Technology Center in collaboration with the Department of Customs
Remark : The Jan.-Mar., 2005, data are preliminary figures.

Furniture Tariff Schedules of the Important Trading Partners

U.S.A		Japan		U.K.	
Wooden furniture	Duty rate : Percents	Wooden furniture	Duty rate : Percents	Wooden furniture	Duty rate : Percents
9403.30	0	9403.30	0	9403.30	0
9403.40	0	9403.40	0	9403.40	2.7
9403.50	0	9403.50	0	9403.50	0
Metal furniture		Metal furniture		Metal furniture	
9403.10	0	9403.10	0	9403.10	0
9403.20	0	9403.20	0	9403.20	0
Mattresses, pillows, cushions		Mattresses, pillows, cushions		Mattresses, pillows, cushions	
9404.10	0	9404.10	3.2, 3.8	9404.10	3.7
9404.21	3	9404.21	3.8, 4.6	9404.21	3.7
9404.29, 10, 90	3.6	9404.29	3.8, 4.6	9404.29	3.7
9404,30, 40, 80	4.2.9	9404.30	3.8, 4.6	9404.30	3.7
9404.90	4.4-12.8	9404.90	3.8, 4.6	9404.90	3.7

U.S.A		Japan		U.K.	
Other furniture	Duty rate : Percents	Other furniture	Duty rate : Percents	Other furniture	Duty rate : Percents
9403.70	0	9403.70	0	9403.70	0
9403.80	0	9403.80	0	9403.80	0
9401.50	0	9401.50	0	9401.50	0
9401.60	0	9401.60	0	9401.60	0
9401.69	0	9401.69	0	9401.69	0
9401.70	0	9401.70	0	9401.70	0
9401.79	0	9401.79	0	9401.79	0
9401.80	0	9401.80	0	9401.80	0
Furniture parts	Duty rate	Furniture parts	Duty rate	Furniture parts	Duty rate
9403.90	0	9403.90	0	9403.90	0
9401.90	0	9401.90	0	9401.90	0

Source : Customs tariff schedules of U.S.A, Japan, Eu

Strengthening and Weakness Analysis of the Rubberwood Furniture Industry

Strengths

- The raw material of the industry is much more available from the wood of domestically cultivated forests.
- Skilled labor is available.
- The markets are certain, that is, the Japan and U.S. markets.
- The wood products are of substantial quality.

Weaknesses

- There is too much reliance on the existing markets.
- Lacking of design and own brand with self identity.
- Limited R&D, product improvement and governmental support.
- Lacking of data, information and new technologies

Opportunities

- To expand the fashion concept of the furniture industry.
- The raw material is subjected to uncertain price all time.
- The availability of rubberwood is unstable.

Problem and Obstacles

Official Regulations

1. At present, to set up a rubberwood processing plant, permission must be sought from the Royal Forest Department according to the Royal Legislation on Forest Law of 1941. The permit takes time to seek, and must be renewed each year. Factory establishment fees must also be paid to both the Royal Forest Department and the Department of Industrial Factories.

2. The processed rubberwood accounting must be prepared into 3 books, which is complicated and time consuming.

3. The rubberwood processing factory must operate from sunrise to sunset, and must open its entrance / exit doors at all time.

4. The permission to import chainsaw takes a very long time to seek.

Causes of Raw Material Deficiency

1. The processed rubberwood demand of the foreign markets has increased. Since China close its forests and Indonesia shut its factories, the important competing countries, such as China, Malaysia and Vietnam, are requiring rubberwood from Thailand for their furniture production to compete with Thailand.

2. The processed rubberwood export has increased since the price is better than domestic sales and the pay is in cash. Since the export of processed rubberwood does not create value added, this problem is resulting in a marketing opportunity loss for Thailand.

Marketing and Trade protectionism

The competitive situation of the rubberwood industry on the world market is rather severe since the competing countries in the middle and low-end markets such as Malaysia, China and Vietnam are at an advantage in terms of labor and raw material costs. The increasing raw material price in Thailand is rendering the Thai production cost uncompetitive on the world market. The trade protection measures of the trading partner countries are as follows :

Japan Market

- According to the Product Liability (PL) Law enacted on July 1, 1995, the producer must compensate for the damages caused by defective goods to the consumer even though that defect is due to naivet'e of the goods producer.

- Wood furniture must be quality inspected and dried to the standard level of moisture content. The cutting of the wood must be controlled according to the standards specified in the Timber Conversion Process and the wood must be controlled according to the standards specified in the Timber Conversion Process and the wood cutting equipment must be according to the law regulating the quality of woodwork cutting tools as well.

- The furniture merchandise must pass the quality inspection and certification such as the "JIS" mark, "S" mark and etc.

The U.S. Market

- The manufacturer must put on a product label, or a label showing the country of original. For merchandise that has passed the UFAC standard, there will be an UFAC tag to put on the merchandise.

- The American Nation Standards Institute (ANSI) is the agency which provides advice to the importing entrepreneurs and manufacturers regarding the raw materials, quality and manufacturing standards of wooden furniture in the U.S.

- The Association of Bedding and the furniture laws of the various states, most of which has the laws governing their production, restoration, disinfection, fumigation, labeling, and selling of bedding with new and used furniture.

European Market

- The import of children furniture and bedroom furniture comes under the Hazardous Products Acts which provide safety protection for the consumers.

- Tropical wood furniture must have a forest certification that the wood cultivates from forest areas with legally permitted according to the laws of their country.

Other Problems

- The distribution channels, development of the marketing channels, and interface with the foreign buyers are not yet strong.

- Products of low quality, high wastes and inefficiency, higher unit cost than the competitors have resulted in a lack of competitive advantage.

- Obsolete manufacturing, lacking of modern manufacturing techniques and management, lacking the capability to compete and worthily maintain the new machines.

- Lacking the development of new product forms acceptable to the world market.

- Insufficiency of quality personnel, skilled labor, and specialists, particularly product designers for the high-end foreign markets which require appropriate material usage and manufacturing processes.

- Lacking of the supporting industries and out-sourcing. For example, the big manufacturers must become fully integrated by expanding their production to the furniture manufacturing parts and materials, which is an investment burden and leads to inefficiency.

Promotion and Support Desired from the Government

1. Import duty reduction.

2. Support for import substituted productions.

3. Support for increasing number of machinery exhibitions to stimulate the development of the industry. Improvement of the manufacturing technology is necessary in order to increase the potential, raise the quality level of the goods, reduce the waste and reduce the production cost.

4. Financial support through financials institutions, SMEs institutions, the Department of Industry Promotion, etc.

5. The wood and furniture industries are labor intensive industries, thus development of the human resource, including the labor skill, design proficiency and technology, must be done concurrently.

Department of industry Promotion and Its Support of the Rubberwood Industry

The Department of Industry Promotion, Ministry of Industry, is the agency responsible for the promotion and development of the industry. The strategy of the Ministry in the year 2005 is as follows :

1. To create new entrepreneurs and improve the quality and strength of existing entrepreneurs.

2. To raise the level of production and administrative capabilities of the community enterprises.

3. To improve the capabilities of the target industries small to medium enterprises in order to substitute the imports and increase the export potentials.

4. To promote the investment in technological research and development, inventions, and activities essential to the economic development of the country.

5. To manage the industries in order to realize an economic, social and environmental equilibrium.

The Promotion to Increase the Export Capability

The support and development of the furniture industry to achieve the target of increased export are within the strategy to improve the capabilities of the target industries and small to medium enterprises in order to substitute the imports and increase the export potentials. The plan of action is to increase the competitive capability at the level of the industrial subdivision, which include such activities as providing advice upon starting a new business, industry nurturing, investment support, information service, factory diagnosis, personnel training and development, design improvement, packaging improvement, preparation of product standards, analysis and testing service, providing indepth advice at the industrial factories, cluster formation, taking the entrepreneurs on field trips and road shows.

The wood furniture and products industry is one of the subdivisional industries with the target to increase the export at a rate of 15 percents per year and increase the productivity index at a rate of 12 percents per year.

Improvement of the Furniture Industrial Design

Design is considered very important in the creation of value added for the furniture products Particularly, 80 percents of the Thai furniture production are still made to order (OEM), which are very difficult to compete against the cheap goods producing countries such as China, Vietnam, etc. If these factories develop into manufacturing in which the manufacturers provide their own design (Original Design Manufacturing : ODM) and have their own brand names, the value can be further increased, and the goods can also be elevated to the high-end.

The Ministry of Industry has emphasized the importance of design improvement by establishing a Design Center for the subdivisional industries, including the furniture industry. This Center will centralize the furniture design data, design improvement, and design learning and training.

Promotion the Use of Rubberwood as the Raw Material

Under the Ministry of Industry's support, the wood furniture and products industry has used the indigenous raw materials to produce goods, generating an export value added and a currency income to the country of almost one hundred thousand million bahts each year. Thailand is the soure of the important raw materials such as rubberwood with the largest wood production in the world, and teak with the best quality in world. These should be put to use in the industry worthily, with longterm management and environmental concern, First, the raw material should be sufficiently reserved for the entrepreneur's domestic consumption in order to alleviate the problem of wood raw material shortage; if there is a remainder, then it can be exported. However, the wood products entrepreneurs must provide data on the amounts required so that the sawmills can provide the processed wood which is in excess of the domestic user demand, and are not left with huge wood inventories. This will benefit both parties.

Addition Comment or Counsel

Collaboration between the associated industries from the upstream industries to the downstream industries is essential for helping each other to find the way to compete against the foreign countries, and it is not competing against each other inside the country that would generate strength. In the improvement of furniture industry, the domestic supporting industries should be developed in order to be able to obtain furniture manufacturing raw materials of low prices good quality, and adaptability according to the requirements. This will increase the competitive capability of the Thai furniture industry against the foreign countries.

Responsibilities of the Agency with the Rubberwood Industry Promotion Function

The Section of furniture and Composite Industries is the agency under the Department of Industry Promotion, Ministry of Industry, which has the function of promotion and supporting the furniture industry.

The Principle Activities Include :

1. Providing an advisory service regarding the production, management, product design, equipment layout, and process improvement within the furniture industry factories in order to increase the production efficiency and achieve the standards.

2. Providing a training/seminar service regarding the manufacturing techniques and the marketing situation, as well as factory visits and field trips, for the development of the entrepreneurs and factory personnel.

3. Providing an information service, disseminating data, study results, academic articles, teaching media in the form of VDO and CD.

4. Providing a product analysis and testing service, testing the strengths, durability of products, materials and equipment to meet the international standards.

5. Providing a design and prototype preparation service, assisting in the design as well as preparing the proper production prototypes in order to raise the level of production.

6. Providing a business nurturing service to the new entrepreneurs who have started or are about to start the new investments.

7. Providing an investment advisory service.

Rubberwood Utilization

The rubber trees that are felled in an area of 1 rai will yield a rubberwood volume of approximate 44.6 cubic meters, or approximately 30 tons, which can be divided into 2.87 cubic meters of pilings, 20.4 cubic meters of sawlogs, 21.09 cubic meters of fuel wood.

The processed rubberwood used in the furniture and furnishing industry is obtained by processing the sawlogs, which yields approximately 9.7 cubic meters of processed wood, or approximately 47 percents of the sawlogs.

From the website of the Department of Industrial Factories, Ministry of Industry, according to the data as of May 23, 2004, there were 815 rubberwood related plant, which can be divided into 462 processing manufacturing 96 drying plants, 27 furniture parts manufacturing factories, and 56 furniture manufacturing factories.

In the utilization of rubberwood , the available rubberwood will be more or less depending on the number of rubber trees remaining before felling and planting new crops. In addition, it also depends on the planted rubber strains which have different maturation and latex yields. The current rubber plantation are of good rubber strains with high latex yields and smaller sized rubber trees than the rubber trees of native strains. The average life of the planted good-strain rubber tree is 20-23 years. The average number of rubber trees remaining before felling is 65 trees, amounting to a utilizable rubberwood volume of 38 cubic meter per rai. This can be utilized to furniture and parts from rubberwood, with the remainder used to make crates, pilings and charcoal.

Table 12 Showing Rubberwood Utilization According to the Quality and Size

Part	Cubic meters/rai	Percents
1. wood for furniture and parts	13.3	35
2. wood for commodity crates, fruit crates (no holes)	6.8	18
3. wood for pilings, construction work pillars	4.6	12
4. wood for fuel and charcoal burning	13.3	35
Total	45	100

If 250,000 raise of rubber trees are felled to plant replacements, a total wood volume of 9.5 million cubic meters will enter the rubberwood market. Approximately 30-35 percents of the wood volume yield per rai, or approximately 2.9-3.3 million cubic meters of rubberwood can be taken out and utilized. The rest are ridded by burning since they are remotely located and cannot be utilized.

The Present situation of Utilization on Rubberwood

Processed Wood (Sawn Timber)

Currently, there are approximately 175 registered rubberwood processing sawmills. In addition, there are also mobile sawnmills which perform rubberwood processing in the rubber plantations. The increase in the number of sawmills is a result of the rubberwood demand, both domestic and foreign.

Furniture and Parts

The ruberwood is used to manufacture furniture of several forms, from the interior furniture, such as dinner table sets, typical furniture, living room furniture, and cabinets, to the lawn sets (in gardens). Due to the natural cream color and the dyeing quality, rubberwood furniture, either fully assembled, semi knock-down, or complete knock-down, are readily accepted by the export market. There are 2 manufacturing groups. One group uses the solid and glue jointed rubberwood, and the other group specializes in the furniture with veneer plywood parts, such as trees-piece low tables and chains in which the legs are made of processed timber, the table tops and seats are glue jointed wood boards, and the curved parts of the chairs back-rests are made of veneer plywood. As a result of the increased demand for the furniture which used curved veneer plywood parts, many more plywood plants are installing special peeling machines to produce veneers from rubberwood. Many more furniture manufacturing are also installing rubberwood veneer peeling machines.

Shaping, Parquets, Flooring, and Components

The cream color and dense surfaces of the processed timber combined with processability and high quality finish have rendered the rubberwood a suitable material for shaping into the interior decoration ridges, as well as for shaping into the large articles such as door frames, window frames and other components. The rubberwood can also be used as flooring and parquets.

The presently used large shaped wood are of glue jointed rubberwood boards which may have veneer facings. Since the cut length of rubberwood is limited to 2 meters, joining the wood by finger-joint is necessary for the manufacture of large shaped wood parts.

Kitchen Utensils

Many household utensils are produced from rubberwood, including salad bowls, fruit trays, mincing boards, cheese boards, meat boards, knife holders, salt and pepper trays, which are produced by glueing together the small pieces of rubberwood, resulting in the most efficient use of the wood. These products require clear and nontoxic surfaces. The rubberwood kitchen utensils are popular in North America and the European countries.

Wood Toys

Rubberwood toys are produced for domestic use and export. But in the color coating of toys, chemicals nontoxic to human must be used.

Rubberwood as Construction Materials

The specific qualities of the rubberwood can be easily adapted by finger-joint and pressure glueing into large pieces for use as beams, colums, weatherboards, etc. But constructing an all rubberwood house is still expensive. Nevertheless, with appropriate pressing and techniques, quality construction parts can be produced from rubberwood.

Rubberwood-Polymer Composites

Wood and polymer composites (WPC) are obtained by impregnated monomers into the wood and finally polymerizing the monomers in the wood. The wood and polymer composite formed in this way are resistant to decay, have increased mechanical properties, and will not distort.

The stiffness, compressive strength abrasion resistance, and decay resistance of rubberwood can be increased by impregnating with monomers in a ration of 200 kg/m3. Tests have proven that rubberwood and polymer composites (RWPC) can be produced, and these composites can be used to manufacture flooring, parquets, stair steps, and other parts.

Flat Boards from Rubberwood

Rubberwood is commercially used in the production of flat boards such as particleboards, cement-boarded particleboards (CBP), black boards, medium density fiberboards (MDF). The typical thickness of the rubberwood particleboards is from 4-19 mm, density 600 gm/ml. They may be plain or laminated with a variety of patterns and wood grain, These flat board products are earnestly used in the furniture and parts industry to manufacture bathroom cabinets, clothing cabinets, side cabinets, leftovers cabinets, working tables, room partitioning panels, door frames, door, and kitchen cabinets.

Another types of particleboard is molded particleboard which are used 100% rubberwood as the wood component, passed through a rubberwood and synthetic resins mixing process concerned with a quality adaptation by chemicals, and laminated with an abrasion resistant material for use in the manufacture of furniture parts such as table tops, seats, chains backrests, ceiling panels, etc.

Rubberwood strands are used to make thick boards for use as the middle layer in the manufacture of black boards. Most of these goods is for export. The rubberwood flakes are specifically used for the production of CBPs, which have the properties of wood, but are more resistant to weathering, flames, molds, insects, and have a good acoustic property. Wood boards with a thickness from 8-40 mm have been produced for different uses. These CBPs are suitable for various uses, both interior and exterior, especially in the construction industry.

The MDF boards are widely used to manufacture furniture such as table tops, cabinets, doors, and bed interiors.

Pulp and Paper Manufacturing

The production from rubberwood for paper manufacturing is of interest since the color is light and the potentials are similar to sulphate pulp.

The rubberwood pulp is suitable for the manufacture of writing and printing paper, corrugated boards, and as a component in newsprint. The latex content is an obstacle in the commercial use of this pulp, but the Japanese have used rubberwood pulp in commercial manufacture of corrugated boards.

Charcoal and Compressed Charcoal

The small pieces and anteriors from the cutting and slicing of rubberwood can be produced into charcoal using mobile stoves, which are suitable for the small rubber tree planters and factories with waste wood. The small rubber tree planters can earn extra income. The small pieces and anteriors of the wood can also be milled and used to produce compressed wood chips and charcoal, which is mostly used as fuel, especially in Japan, Korea, Australia, etc. Which charcoal is another from of charcoal which can be produced from rubberwood. This product is considered a clean form of charcoal with little smoke upon burning, and is mostly used in Japan.

The rubberwood has been accepted as a quality processed timber which can be used to produce a wide variety of products. The raw material is readily available due to the replacement planting every 25-30 years. Even though the usage volume is increasing, by a careful estimate, there are still more than one third of the total wood supply that have not yet been put to use. Thus, there is a potential for the future development and utilization of this raw material in every countries with rubber cultivation.

Export and Import Control Measurement

1. Export Control Measurement

The Ministry of Commerce has controlled the export of wood and processed wood, including the rubberwood, according to the Forest law ever since the year 1977. According to the Royal Legislation on the Control of Export to Outside the Kingdom of Centain Goods (Series 46), 1977, rubberwood is now a goods within the scope of export control, or goods for which permission must be sought to export out of the Kingdom.

1.1 The Scope of Export Control

Rubberwood within the scope of export control includes the wood and processed wood of rubberwood as well as the rubberwood wastes, but does not include the rubberwood which has been made into finished articles and the rubberwood which a person has taken out with him for his personal use, or a vehicle has taken out for use in their vehicle, or taken out for use as sample.

1.2 Export Permission Criteria

1.2.1 The wood must grew up possessed land, and can be exported as both timber and processed wood.

1.2.2 Irrevocable letter of credit must be provided as evidence of buying and selling.

1.2.3 The wood must be certified that it has already been dried or immersed in chemical solution.

1.3 Documents Complementary to the Export Permission Request

1.3.1 Document showing ownership of the land used to grow the rubberwood intended to export, such as the land title, Nor Sor 3 Gor, Nor Sor 3, Sor Kor 1, or a certificate of certain land utilization.

1.3.2 Certificate for the admission on land to cultivate rubber trees from the relevant official agency such as the forest districts, land district, or rubber plantation welfare bureau, or a certificate from the owner, possesser, or person who holds rights over the land may be shown instead of the official certificate.

1.3.3 Farmer contact agreement between the rubber plantation owner and the exporter.

1.3.4 Certificate from the rubberwood processing or drying factory certifying that the rubberwood to be exported has already been dried or immersed in chemical solution.

1.3.5 Operation permit of the factory issuing the certificate according to 1.3.4 (Ror Ngor 4.)

1.3.6 Irrevocable letter of credit as evidence of payment.

1.4 Submission of the Export Permission Request

The export permission request can be submitted at the office of Import and Export Service, Department of Foreign Trade, and the Regional Foreign Trade Bureau everywhere, using the printed form Aor 3 amd Aor 4 along with showing the above mentioned documents.

2. Import Control Measurement

To import rubberwood and processed rubberwood as well as artifacts or any other article made of rubberwood into the Kingdom through the customs barricades in the Provinces of Chiang Mai, Chiang Rai, Tak, Mae Hong Son, Kanchanaburi, Ratchaburi, Phetchaburi, Prachuap Khiri Khuan, Chumporn, and Ranong, a certificate of origin or evidence of export permission from the exporting country must be shown to The Customs Department complementary to the import proceeding, and if importing rubberwood as timber, a stamp of the producing country must also be affixed to the wood.

3. Tariff Measurement

3.1 Export Tax

Rubberwood and processed rubberwood are subjected to pay an export tax at a rate of 3 percents.

3.2 Import Tax

Unprocessed rubberwood (timber), import duty rate regulation type 44.03, must pay an import tax a rate of 1 percent of the value. For processed rubberwood which is a commodity according to the import duty rate regulation type 44.07, the import tax rate of the wood which has not been planed or jointed is 1 percent of the value, and of the wood which has been planed or jointed 5 percents of the value.

The Export of Wooden Furniture

The export value of wood furniture and wood products has continuously increased as can be seen from the export value of 17,615.3 million bahts in the year 1999 which has increased to 24,431 million bahts in the year 2003, with an average growth rate of 7 percents per year. The important wood furniture export markets include U.S.A., Japan, Canada, U.K., Germany, the Netherlands, and France. As for wood products, the important export markets include U.S.A., China, Japan, Hong Kong, U.K., Malaysia, and South Korea. The export of wood furniture and products is not subjected to export tax.

From a study of the data pertaining to the rubberwood industry, SWOT analysis of the rubberwood industrial development can be made by examining in sequence from the strengths to the problematic weaknesses, threats, and opportunities. These can be summarized as follows :

Strengths of the rubberwood industry which can be counted as strengths are as follows :

1. The rubberwood helps to reduce the destructive severity of the natural calamities.
2. The rubber plantation help to conserve the environment of the country and of the world.
3. The rubber plantations help to increase the Thai economic forest area by 12.3 million rais.

4. It has engendered a variety of businesses from the upstream industry to the downstream industries.

5. The export value of the processed rubberwood, wooden furniture and parts, and other products is approximately 55,757 million bahts per year.

6. It has engendered the ensuing businesses, such as fertilizers, chemical, rubber, auxiliary materials, machineries, packaging, water, electricity, transportation, and others, with a value (excluding imports) of 50,000 million bahts per year.

7. It has generated an industrial employment of approximately 5 hundred thousand personnel, with an annual income of approximately 50,000 million bahts.

8. It has generated a monetary circulation within the relevant economic system of several ten thousand million bahts per year.

9. It has created the infrastructure supporting other parts of the economy such as transportation routes, shipping ports, airports, industrial estates, and others.

Weaknesses of this industry are as follows :

1. The increasing prices of rubberwood are incremental costs to the rubberwood industry entrepreneurs.

2. Losses in the production process are high. From the rubberwood weighing 1 ton that has been passed through the conversion process, only a 24 percent yield is obtained, the remainder being wood shavings, sawdust and wood chips.

3. Labor and skilled labor are deficient, necessitating the use of immigrant labor, both legal and illegal. There is still a need for many more skilled labor.

4. The entrepreneur clusters still lack the activities to stimulate their operation. Price cutting against each other is prevalent as the buyer would negotiate with every entrepreneurs until the lowest price is reached.

5. The industrial supporters lack cluster formation to provide the assistance.

6. The maintenance of wood is costly, and must be under taken within a short period.

Threats are various such as :

1. There is no systematically established vision and planned development of the rubberwood industry.
2. The government's policy does not yet include a plan to directly support the rubberwood industry.
3. There is an adverse impact from the price of rubber which the government supports.
4. The processed rubberwood export policy has resulted in a deficiency of domestic rubberwood.
5. The palm plantation promotion policy has resulted in a decrease in rubber plantation area.

Opportunities of the rubberwood industry are still many for the following reasons :

1. The domestic raw material is plentiful.
2. The demand for products which are not detrimental to the environment is increasing.
3. The foreing countries still require rubberwood.
4. Some countries such as Malaysia have reduced the cultivation areas, while the political situation in Indonesia is not favorable for wood industry business.
5. The government promotes the planting of rubber trees to replace the ones felled.

Thus, the opportunities to develop the rubberwood industry are still numerous. The rubberwood can be developed to create value added and utilized to the maximum in various forms. It is estimated that if the volume of the rubberwood felled at 2 hundred thousand rais/year is utilized, the wood can create an economic value of approximately 65,000 million bahts. If the export value of smoked rubber sheets, which use rubberwood as raw material in smoking is included, the value would be as much as 97,000 million bahts. From this existing economic value, not yet including other economic values that would be realized from the potentials and opportunities of full integration, the importance of serious creating economic value from the rubberwood can be seen. This would serve to increase the income of the rubber plantation owners in the grassroot economy, future strengthen the small entrepreneurs in SMEs, broaden the base of the downstream industries to cover the maximum and all-sided utilization of the rubberwood, and create an optimal equilibrium in the development of the rubberwood industry as a whole.

The establishment of a strategy to develop the rubberwood industry as a whole is thus necessary for the establishment of tactics, measures, and operational procedures to be used in the development, of limitations, knowledge base, research and development in the various fields, especially technological, and of the rubberwodd equilibrium, as related to the rubberwood industry as a whole, which would increase the capability to utilize the various existing attributes and potentials of rubberwood to the maximum and enable the future establishment of goals and structures, opportunities and development of the Thai rubberwood industry in a clear, long lasting, united, systematic direction on the basis of justice and equality.

Suggestions

Even though the rubberwood industry is still, today, a business which generates good income for the entrepreneurs and for Thailand on the whole, from the current of free trade opening and globalization which has increased the competition, among the producer the business needs to adapt and develop the various capabilities in order to survive, but in the reality of less than perfect information system, the business cannot be expected to adapt according to the various warning signals by itself. Moreover, signals

from the market mechanism alone are not sufficient for the business to seriously invest in its capability improvement. Particularly, the small and medium business are still accustomed to do business within the fixed framework of old concepts and practices, whereas the business development and conduct today have been changed to such an extent that more than a few businessmen are faced with problems when they have to devevop the various capabilities. It is thus very essential for the government to provide serious and highly efficient business supporting measures.

Suggestion for the Long-Lasting Development of the Rubberwood Industry are as follows :

1. Enhancing the Strength of the Industry

1.1 Perception of the market demand might be realized by a direct survey of the customers' requirements, by integrating the data with the Department of Export Promotion for the collection of domestic and foreign data, or by constructing a website, providing search option according to the requirements of each customers' group. In addition, FSC standard requests should be encouraged in order to build the image of a wood which is not detrimental to the environment. New product forms should also be studied and developed to conform with the market demand. The data base should be collected, classified, and processed to summarize into the necessary data bases. Electronic media and printed matters should be developed for communicating to the entrepreneurs and various support groups as well. These will strengthen the wood industry.

1.2 Improvement of the rubberwood products by preparing and developing curriculums used in the training to promote and develop woodwork specialists, preparing woodwork manufacturing technology training projects by requesting collaboration from JICA or other institution, and arranging rubberwood products design contests.

1.3 Creating an innovation protection mechanism, publicizing and promoting the protection of products by product protection registration.

2. Developing and Reinforcing the Clusters

2.1 Creating a group to promote coordination between the members within the cluster.

2.2 Linking the works of the industry and the supporting agencies, mutual meeting between the government sector and the private sector, reviewing the development master plan.

2.3 Creating opportunities to develop the cluster, generation mutual activities within the cluster for the most benefits.

3. Improving the Production Efficiency

3.1 Providing production personnel sufficient to the need of the industrial sector by cooperation with the labor skill development agencies, the local education institutions, developing personnel for the positions with deficiency, and raising the level of existing labor skill. More extraneous Thai labor might

have to be informed and induce to work in the area. In addition, seminars on the proper labor management guideline should be arranged by practical training on subjects specific to the rubberwood subdivision in conjunction with educational institutions. Or two-party hiring of students in the rubberwood subdivision might be carried out, or a guideline to simplify the immigrant labor registrations regulations might be presented.

3.2 Developing the production personnel by establishing the skilled worker standards and learning measurement criteria, providing both theoretical and practical training to the operators regarding sawing, wood drying, wood shaping, and coloring, as well as machine installation techniques, jig construction, machine repair and maintenance, and quality control, operational safety. In addition, learning measurement tests should be conducted, and labor skill contests should be arranged in the various fields such as sawing, coloring, etc.

3.3 Developing the production techniques and technology by linking with the foreign entrepreneurs or experts for the technology transfer, improving the equipment and tools used in the production as well as producing the equipment which have been improved for commercial sales, studying and improving the working procedures by using engineering techniques to improve the production steps, that is, sawing, wood drying, shaping, and color work. In addition, the industrial sector should be encouraged to set up a joint agency for machinery repair and maintenance service, to coordinate with the regional research agencies for energy efficiency improvement, and to form into technical development groups for energy saving.

3.4 Preparing production and product standards, the latter including processed wood parts and furniture, by establishing the standards and the product quality testing methods jointly between the government sector and the private sector, studying the factors which affect quality of the goods or cause damages to the products before reaching to the hands of customers, studying and comparing each operational mode in order to obtain the most efficient operation, studying the proper working environment and safe working procedures, establishing the operational steps from the studies, preparing the production standards and put into particle, providing a rubberwood product testing service agency for the industrial sector, as well as creating a quality product commodity brand, publicizing, and campaigning for a general use of the brand.

4. Improving the Management Efficiency

4.1 Arranging seminars on the various management techniques for the project participants, arranging visit activities to the companies with systematic management, providing diagnostic activities or business analysis clinic, creating a network of business consultants both inside and outside the area, arranging special activities to provide group consultation which emphasizes only the necessary aspects such as TQM, 5 Sor quality system, operational status analysis through the financial statements, etc.

Characteristics of the Wood Products which the Foreign Markets Require

The characteristics and standards of the wood products which the foreign markets require are different among each country or group of countries. From the survey, the following points can be summarizes :

U.S. Market

The merchandises require in the U.S. market are of specific characteristics such as wood grain of plain color, not striking, harmonious, with an earth tone emphasis. The format of the merchandise such as the thickness of the wood is usually determined by the customers themselves, and the standards used are of the American National Standards Institute (ANSI).

Middle East Market

The Middle East counties require wood products with unfamiliar appearances such as uneven surfaces, engraved wood. From the rather hot climate in this region, the wood products exported to these countries must possess heat and humidity resistance properties, and certain chemical constituents must be increased to improve the heat and expansion/contraction resistances.

European Market

The European market emphasizes durability of the wood and aesthetic grain, which sometimes depends on the taste of the individual customer. The currently popular merchandise standards are mainly the standards specified by the customers. Characteristic of the wood required are, for example, veneer wood with thicknesses of about 0.55, 1.4 and 2.8 mm.

Japanese Market

Japanese market stresses good quality merchandise with color, pattern. The thickness must correspond to that specified by the customer. The merchandise standard used is the Japan Industrial Standard (JIS).

Chinese Market

Chinese stresses the import of wood from Thailand for subsequent production into finished products. The wood which Chinese customer prefers to import includes processed wood, plywood and fiberboards.

Advantages and Disadvantages of Thailand Compared to the Competitors

For the wood industry in Thailand, after the logging ban (according to the Royal Legistation on logging ban in the Whole Country on January 15, 1989), the domestic hardwood raw material has been shortage. But Thailand still has sufficient resource of rubberwood, and other types of hardwood can also be easily imported from the neighboring countries. However, there are important competitors exporting the wood products such as Malaysia, Singapore, since they are adept in product form design and their governments support the export industries.

Advantages and Disadvantages of the Competing Countries Compared to Thailand

Country	Advantages / Disadvantages
Indonesia	Advantages - This country is ready in raw material which is domestically available in large amount. The large amount of timber which is very important in the production process has resulted in an Indonesia's advantage over Thailand in a lower raw material cost. Disadvantages - The quality of labor skill in Indonesia is still inferior to Thailand. - The quality of goods producer is lower with respect to form and durability of the wood.
Malaysia	Advantages - Due to government's support, industrial goods producers in Malaysia receive promotional funds from the government sector in the export of processed wood, such as cheaper ship freights. - The timber raw material is available in large amout, so there is no need to rely on imports compared to Thailand, and Thailand also has to import the urea glue used in the production process from therefore Malaysia's raw material cost is lower than Thailand. - The goods are of good quality. Disadvantages - Thailand's labor skill is better than Malaysia.
U.K. and Europe	Advantages - Quality of the goods is rather very high compared to the various countries in Asia. - The color, grain, and design are rather of better form and taste than any other producing country in Asia. Disadvantages - The cost is very high due to the raw material and labor costs.

Taiwan	Advantages - The machine technology is modern. Most producers in Thailand are importing machines from Taiwan since, besides modern technology, the prices are also cheaper than the machines from Germany and Italy. Disadvantages - Taiwan has higher timber raw material and labor hiring costs than Thailand, but there is a trend to allocate the factories in Taiwan into China which is a big market, including Hong Kong.

Suggested Solution to the Problems of the Construction Wood Product Industry

Problem of the Industry	Guideline for the Solution of the Problem
1. Lacks development of new, value added product forms acceptable to the world market. Thai exporters still do not place importance on product development and lack new product form research and development which the foreign construction technology is changing rapidly.	- The exporters should set up a budget for new technology researches to be able to produce value goods. - The government sector should provide the support of low interest loans for new product form research and development, and investigate the development of new product lines with tendency to be demanded by the market.
2. Lack of the development on a Thai products brand image.	- Provide publicity, urging the exporters to see the importance of participating in foreign exhibitions to disseminate Thailands production potentials and build confidence. - Provide a development project to build acceptance of the Thai processed wood commodity trademark in the foreign markets by participating in international exhibitions, especially the Wood Mac Asia which is regularly organized in Singapore.

3. Lack of the development on strong marketing channels. Exports must rely on foreign agents, impeding development of the export channels.	- The government sector should promote meetings between the Thai exporters and the foreign customers or foreign trading agencies, enabling the Thai exporters to know and select trading alliances, and build marketing networks in the long term.
4. Lack of the development on labor quality to increase the value, efficiently developing the Thai goods for foreign markets.	- Coordinate the policy to improve labor quality in the wood industry with the Institute of Labor Skill Development, Ministry of Labor and Social Welfare.
5. The wood producers and exporters lack group formation to support each other and collaborate in marketing. Today, only the plywood group has been formed, but the processed wood still lacks group formation.	- Organized Thai processed wood and plywood trading groups/associations to help each other with the government sector or big entrepreneurs as central coresin the formation and the marketing information as main mutual benefits.
6. The companies are not adept in business dealings with foreigners.	- Promote, provide knowledge, and develop the industry's export marketing personnel in order to increase the knowledge and skill in foreign business dealing, provide training courses and opportunities for the industry's exporters to exchange export marketing experiences.
7. Production efficiency of the Thai exporters is still not as good as should be due to the lack of modern production techniques, proper management, and ability to use and maintain the machines.	- Production cost of the goods should be reduced using good production and production management techniques to help reduce the production waste rate and increase the production efficiency.

Rubberwood Strategy for the Years 2004-2008 Ministry of Agriculture and Cooperatives

As a consequence of the strategic plan to improve the Thai official system in order to increase the public service efficiency and support the country's development in the era of globalization, the Ministry of Agriculture and Cooperation, as a principle ministry, has a policy to propel the export of agricultural commodities and foods in order to increase the income into the country from 0.7 trillion bahts in the year 2003 to 1.2 trillion bahts by the year 2008, including a policy to promote the production of goods in on order to substitute the imports. A directive was thus given to prepare strategies for the important agricultural commodities. Rubberwood is a longstanding tree for which a strategy must be prepared since rubberwood is an economic wood which can be value added by processing and produced into products with market demand, both for domestic use and for export, generating a continous income into the country.

As for the raw material, rubberwood results from the cutting down of rubber trees in old rubber plantations. With long extraction time, the rubber trees deteriorate, providing a low output per rai, not worthing the investment. The agriculturers of the relief rubber plantations are replanting 280,000 rais per year. For the year 2004, the Ministry of Agriculture and Cooperatives has established a Compassion Rubber Plantation Project to bring approximately 1 million rais of rubber plantations which the agricultures had planted in the forest reserves into the system, relieving an additional 140,000 rais per year. Thus, each year, a total of 420,000 rais of rubber trees can be felled to replant, amounting to approximately 17 million cubic meters of wood. Therefore, the raw material which can be processed for the rubberwood product industry will be sufficient.

In the year 2003, Thailand had exported processed rubberwood and products to the various countries with a total value of 47,393 million bahts. These were exported to Japan, U.S.A., England, Canada, Hong Kong, Vietnam, Malaysia, Taiwan, etc., with an average growth rate of 15 percents per year.

As for the domestic market, in the year 2003, the domestic use of processed rubberwood and products amounted to a total value of 16,778 million bahts, with an average growth rate of 10%

Today, Thailand is an industrial exporter of rubberwood and related products, which are exported in the forms of furniture and parts, processed rubberwood, and related products, with important competing countries such as China, Taiwan, Indonesia, Malaysia, Vietnam, Philippines. Particularly, China is an important competitor regarding the products of medium density fiber (MDF) and particle boards (PB). It is constructing more than 30 plants within the years 2004-2006. This, combined with China's

lower labor cost compared to Thailand, will result in low production costs. It is expected that both of these types of wood products from China will certainly create problems for Thai wood market in the near future. From the facts that China which is a direct competitor is expanding its production capacity and has an advantage in low costs, the government should introduce support and promotion measures for the rubberwood product business entrepreneurs to survive and be able compete against China and other countries.

Assumption Used to Determine the Rubberwood and Products Strategy for Years 2004-2008

1. Area to felling and replantion rubbertrees 420,000 rais per year
2. Volume of rubberwood timber 40 cubic meters per rai
3. Middlestream industries, inclyding

3.1 Processed rubberwood	20% of total volume
3.2 Wood shavings	26% of total volume
3.3 Sawdust	11.25% of total volume
3.4 Particle boards	11% of total volume
3.5 MDF	10% of total volume
3.6 Veneers	2.50% of total volume
3.7 Used as fuel for smoked rubber sheets	19.25 of total volume

4. Downstream industrie's export

4.1 Furniture parts (as processed lumber)	3.69 million cubic meters Price 34,000 bahts/m3
4.2 Construction materials	0.28 million cubic meters Price 30,000 bahts/m3
4.3 Toys	0.48 million cubic meters Price 70,000 bahts/m3
4.4 Picture frames	0.21 million cubic meters Price 34,000 bahts/m3
4.5 Household utensils	0.32 million cubic meters Price 45,000 bahts/m3
4.6 Souvenirs	0.02 million cubic meters Price 3,600 bahts/m3
4.7 Wood furniture	1.43 million cubic meters Price 12,000 bahts/m3

Data : Rubberwood Traders Association of Thailand

Targets

1) Replanting with new hybrid rubber strains which provide high yields of both rubber latex and high quality rubberwood 420,000 rais per year.

2) The owners of the rubber plantations can sell rubberwood at 30,000 bahts per rai at the plantations site.

3) Export value of processed rubber and products increasing from 47,393 million bahts in the year 2003 to 94,612 million bahts in the year 2008

Item	2003	2004	2005	2006	2007	2008
Export value of processed rubberwood and products	47,393	55,431	64,448	73,141	83,137	94,612

Goals of The Rubberwood Development Strategy

Goals	Volume Million m^3	Price Bahts/ m^3	Indicator (KPLS)	Basline Data	Targets '04-'06	'04	'05	'06	'07	'08
Rubber replanting			Replanting area, rais/year	200,000	420,000	420,000	420,000	20,000	420,000	420,000
Upstream industries Rubber timber			Volume of rubberwood timber 40 cubic meter/rai unit : million cubic meters	8	17	17	17	17	17	17
Middlestream industries (Secondary Processing)										
Processed rubberwood			Volume of processed rubberwood, million cubic meters	1.6		3.6	3.6	3.6	3.6	3.6
			Volume of wood shavings, million cubic meters	2.1		4.4	4.4	4.4	4.4	4.4
			Volume of sawdust, million cubic meters	0.9		1.9	1.9	1.9	1.9	1.9
Particle boards			Volume of particle boards, million cubic meters	0.88		1.8	1.8	1.8	1.8	1.8
Medium Density Fiber boards			Volume of MDF, million cubic meters	0.85		1.70	1.70	1.70	1.70	1.70
Veneers (certain types of plywood)			Volume of veneers, million cubic meters	0.2		0.4	0.4	0.4	0.4	0.4
Smoking			Volume of rubberwood used as fuel	0.15		3.2	3.2	3.2	3.2	3.2
Middlestream rubberwood industries			1 million trees uses 150,000 m^3	67,961	81,773	74,115	81,526	89,678	98,646	108,511
Downstream industries (Tertiary processing)			Total export value/year/million bahts							
Furniture parts	3.960	34,000		131,007	122,400	134,640	148,104	162,914	179,206	197,126
(processed lumber)			Export value of processed lumber parts, million bahts							
Construction materials	0.280	30,000	Value of construction materials, million bahts	8,048	3,907	8,400	9,240	10,164	11,180	12,298
Toys	0.480	70,000	Value of toys, million bahts	32,925	4,965	33,600	36,960	40,656	44,722	49,174
Picture frames	0.210	34,000	Value of picture frames, million bahts	6,609	3,906	7,140	7,854	8,639	9,503	10,453
Household utensils	0.320	45,000	Value of household utensils, million bahts	13,374	7,548	14,400	15,840	17,424	19,166	21,083
Souvenirs	0.002	3,600	Value of souvenirs, million bahts	67	38	72	38	42	46	51
Wood furniture	1.430	12,000	Value of flat board furniture, million bahts	15,340	14,210	17,157	18,872	22,646	24,911	27,402
Total export value/year, million bahts	6.682	228,600		207,370	61,298	215,409	236,908	262,485	288,734	317,578
Development support of domestic rubberwood entrepreneurs			Number of rubberwood processing plants			687	678	687	678	687
			Number of wood manufacturers			3,832	3,832	3,832	3,832	3,832
Agriculturers receiving professiontraining and development			Number of agriculturers receiving profession development to become self reliant, millions			6	6	6	6	6

Guideline

1. Production aspect : The plan to convert assets into capitals

1.1 Compassion rubber plantation project

Targets :

- Issue land leasing deeds to bring rubber plantation areas of the agriculturers in forest reserved areas into the system to convert assets into capitals.	Budget year 2004	Area / rais 1,002,100
- RPO allocates land leases and issue land and rubber tree leasing deeds (Gor Yor Tor 1).	2004	
- Manage the felling of rubber trees for relief replanting in forest reserved areas (Gor Yor Tor 1).	2004	

Budget : 276 million baths.

Indicators :

- Area of the rubber plantation in forest reserved areas entering the system of the plan to convert assets into capitals 1,002,100 rais.
- Area of the rubber trees felled for replanting 140,000 rais.

1.2 Project to convert rubber plantations into capitals

Target :

- Issue rubberwood rights in relief rubber plantations (Gor Yor Tor 2).	2004 - 05	4,500,000
- Manage the felling of rubber trees for relief replanting in normal cases.	2004	280,000

Budget : Cess fund of the office of the Rubber Replanting Aid Fund.

Indicators :

- 422,385 owners in a rubber plantation area of 5.5 million rais have access to the source of fund of 165,000 million bahts.

2. Processing aspect : The plan to develop the processing of rubberwood products in order to increase the value

1) Project to commercially process new products from rubberwood

Target :

- Increase the number o new products from rubberwood to create variety and a difference in the particular products.

Budget : 150 million bahts.

Indicators :

- The processed rubberwood products are more varied than the previous , such as possessing more utilities in the same products.

2) Project to research and develop the whole commercial system of rubberwood products

Targets :

- Solve the problems to reduce the high production costs.
- Obtain a variety of products and increase the novelty of products.

Budget : 100 million bahts.

Indicators :

- Unit cost of production is reduced by 5 percents per year.
- The number of new products developed to satisfy the market access increases by 5 percents per year.

3. Marketing aspect : The plan to develop marketing

1) Publicity project to introduce products from the rubberwood both inside and outside the country.

Targets :

- Organize a Thai Rubber Day for the product users to meet the entrepreneurs and the entrepreneurs to meet the product users directly.
- Build a Thai rubberwood product brand name , restore the environment and create an ecological balance , reducing the destruction of natural forests.

Budget : 30 million baths.

Indicators :

- Thai rubberwood products being accepted on the world market, increasing the market share by 100 percents per year.
- Export value increases by 15 percents per year.

4. Operation budget for the years 2004 - 2008

Total budget used : 556 million bahts.

5. Responsible agencies

Ministry of Agriculture and Cooperatives

- Department of Agricultural
- Office of Agricultural Economics
- Rubber Estate Organization
- Office of the Rubber Replanting Aid Fund

Ministry of Industry

Ministry of Commerce Thailand

Ministry of Natural Resources and Environment.

Improvement of the Rubberwood Processing Enterprises

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The Importance of Rubberwood

The promotion of rubber in the past had emphasized the topic of using the latex , but today one should look at the topic of the trees , the value aspect of rubberwood. The natural rubber export value of 60,742 million bahts can be devided into more than 40,000 million bahts of rubber products. The part of the furniture of 20,000 million bahts comprises 70% raw material export and 30% domestic use. The value of the industries derived from rubber and rubberwood is not less than 150,000 million bahts.

If the raw material or rubber plantation area of 12 million rais contains 40 cubic meters of wood per rai, there would be 480 million cubic meters of wood. Since the wood felled according to the guideline of office of the Rubber Replanting Aid Fund is more than 200,000 rais per year, for the wood industry, more than 8 million cubic meters of wood will enter the industry. Thailand requires more than 3 million cubic meters of wood. The developed countries require increased amounts. The usage demand is growing all the time. The rubberwood of today comes from sawlogs and is used in the furniture and parts, toys, office furnishings industries.

Guideline to Improve the Rubberwood Processing Enterprises

Today, the rubber trees are planted at a rate of 70 trees/rai , amounting to 40 cubic meters of wood/rai in the felling year. If 500 - 1,000 trees/rai are planted, the availability of raw material would have changed. If we plant for approximately 3 years, then cut the rubber trees down 10%, from 500 trees/rai , 1.4 - 2.8 cubic meters of wood/rai would be obtained. The cutting down can be done every year. Finally, after having planted for 23 years, then cut down 100%. It is also not necessary to extract the rubber in the 7th year. If we can sell the wood and create an economic value, we might extract the rubber in the 14th or 15th year, because the trees would be full grown, providing high yields. The period of rubber extraction would be 10 years, during which the rubberwood can also be sold. In the future, the raw material output would be several trillion cubic meters. Industries to support the wood should be provided. There are many possibilities such as pulp, construction industry, energy industry. Rubber plantations could be served the environment and energy sector, using fuel wood for the small industries. If the supply is suitably created in the future, it can be used to generate energy.

Another thing that should be improved besides the trees is the litter problem. Today, the community litter problem is a social problem. In the year 2001, the Bangkok Metropolis alone has to eliminate approximately 36,000 tons of litter/day.

There are 3 ways of elimination, namely

- converting into fertilizers
- land fill, which is a problem today
- incineration. If we use it as a fuel by mixing with wood, energy can be generated, contributing to the value of the rubberwood. As for the energy consumption structure, we use water power 3%, crude oil 61%, and must rely on the natural gas. Since the prices are subjected to change, the structure might very. If we can manage rubber plantation to 44 million rais, the economic value from selling the rubberwood alone would reach a trillion bahts. If we have a good management plan, in 20 years henceforth, there would be immense utilities from rubberwood. In a Japanese study of the forest management guideline, they propose that if the forests are managed long lastingly, the management system must be revised by reforming the land management system to the maximum efficiency. Another important component is the delegation of management authorities and responsibilities in the forest resources, which should not be concentrated in a particular agency. It is our duty to maintain and improve the environment. The relevant agencies should also participate, supervising the economy, the environment, and society, as well as providing the management to achieve the goals. The Ministry of Agriculture and Cooperatives, The Ministry of Industry, had reformed the industrial structure. The furniture industry was presented as a part which must be modified to improve the value. Within 5 years, there must be many more rectification processes, including of the rules and regulations.

Increasing the Value-Added of Rubberwood

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Rubber tree is a plant which has generated income for the owners since not less than 60 years ago. The latex is extracted, and the latex obtained is passed through the processes to produce smoked rubber sheets, compressed rubber bars. These were exported until renowned as 1 in the 4 principle export commodities of the country, namely, rice, teak, rubber, and tin.

Later, about the year 1969 onward, the prices of wood from natural forests began to rise up, but the entrepreneurs must utilize the wood to produce crates for the packaging of products such as the packaging of engines, motorcycles, bicycles, machineries, and tools sent to sell in the provinces and the foreign countries, the packaging of agricultural produces such as various vegetables, fruits, marine products such as fresh fish, dried fish, etc. These entrepreneurs must strive to find other types of

substitutes. Most of the wood are mango, durian, and rubberwood. Producing these types of wood into crates for the packaging of articles sent to sell in the provinces would buffer the impact, preventing damages during transport, but these types of wood could be used only once or twice before a green mold would appear their surfaces and they must be used as fuel wood or left to rot.

The entrepreneurs producing such furniture as dinner tables, chairs, wood floorings (parquets, mosaics) began to process the rubberwood, then immerse it in chemical solutions, dry, and produce into furniture. The domestic sales were not very successful. By chance, an importer from Japan happened to come across utensils made of rubberwood and saw the beauty of the wood which is yellowish white with unfamiliar wood grain, intermediate wood hardness, and durability and beauty when produced into utensils. So these were produced for export to Japan. Ever since then, foreign buyers have become more acquainted with rubberwood (parawood). The entrepreneurs have also developed the processes to preserve the wood so as to be durable, safe from the wood gnawing insects, green mold and other types of molds. When produced into furniture, the development of forms and the export to various countries were increased. The rubberwood furniture production industry is now a high ranking export industry. In the year 2000, its export value was not less than 22,000 million bahts.

The rubberwood industry is the only industry with large export value which uses 100% domestic raw material other countries such as Taiwan, Japan, China, South Korea, use the rubberwood raw material to made furniture, but do not have domestic rubberwood and must import processed, chemical impregnated, dried rubberwood from Thailand, Malaysia, Indonesia, and Cambodia. The produced furniture is then exported to compete with us in the same markets such as the Japan, U.S.A. and Europe market. Luckily, Thailand has the rubber tree raw material of approximately 12 million rais. (Actually, nobody knows how much there is now since we have been cutting down for almost 30 years, the figure still remains the same.) The National Economic and Social Development Plan No.6 has thus assigned the office of the Rubber Replanting Aid Fund to oversee and accelerate the support for the agriculturers to cut down the old strain rubber trees with low latex yield and turn to the planting of new strain rubber trees with high latex yield. If a certain owners cut down the old strain rubber trees and plant new strain rubber trees, the government would provide a support amounting to a sum of approximately 6,800 bahts per rai, which can be divided into the expense for soil preparation prior to replant of a little more than 3,000 bahts, the expense for new strain rubber trees, the expense for fertilizers and maintenance during a 6 year period of approximately 500 bahts per year.

How to utilize all the felled rubber trees was not known (in the era over 30 years back), so the wood was only burned into charcoal, used as fuel wood, and burned away. But later, from about the year 1987, rubber trees have been sold with increasing prices. For examples the Eastern Region is now selling rubber trees from 28 years old up at 20,000 - 25,000 bahts per rai (with a count of 60 - 64 trees per rai), the Southern Region 12,000 - 20,000 bahts per rai , depending on the difficulty of the route to get in, cut the rubber trees, and transport out.

From the fact that Thailand is an abundant source of rubber trees, the owners who plant the rubber trees metaphorically have gold mines in their homes. That is, when the rubber trees are 6.5 - 7 years old, latex extraction can be started. The rubber extraction period will last until the rubber trees are 28 years old up, yielding little latex, not worthing the rubber extraction labor cost. Then a request can be submitted to cut down and plant new strain rubber, receiving a relief from the Office of the Rubber Replanting Aid Fund at approximately 6,800 bahts per rai. As for the rubber trees to be cut down, there will be people asking to buy, cut the trees, pull up the roots, and neatly clear the plantation. The owners who plant the rubber trees thus metaphorically have gold mines in their homes.

As for the wood which the owner has sold to the wood-man, who will cut down the rubber trees for sale to the sawmill. After sawing, these will be chemical impregnated, dried, and sold to the furniture manufacturer. The furniture manufacturer will produce these into merchandises of various forms, thus improving the value added of rubberwood.

The selling price of processed, chemical impregnated, dried rubberwood is 185 - 210 bahts per cubic foot depending on the wood grade selection. These are exported to various countries such as the People Republic of China, Hong Kong, Taiwan, Japan, South Korea, Vietnam, and Malaysia.

After the processed rubberwood has been produced into the finished products such as furniture, utensils on the dinner tables, picture frames, and house decorations, their value will increase by 3 times when exported to U.S.A. and Europe. But if exported to Japan, their value will increase by 5 times, depending on the design and color work.

Table 1 Processed, Chemical Impregnated, Dried Rubberwood Demand of the Furniture Industry[1]

Year	Volume (cubic meters)
1997	1,7500,000
1998	1,500,000
1999	1,500,500
2000	1,400,000
2001	1,300,000
2002	1,300,000

(1) Source : Data from the meeting to assess the export situation of the Thai Furniture Industry Association

Table 2 Export Values of Furniture between the Years 1997 - 2001[1]

	Value (million bahts)				
	1997	1998	1999	2000	2001[2]
Furniture and parts	22,180.30	25,973.20	30,114.90	38,160.20	17,943.00
Wood furniture	14,393.00	17,770.60	21,682.10	27,833.20	12,615.10
Metal furniture	2,834.90	2,987.10	3,483.10	4,431.70	2,272.90
Mattresses, pillows, cushions	1,192.20	1,312.90	1,454.30	1,366.50	731.50
Other furniture	824.00	1,823.00	1,112.20	1,691.90	993.30
Furniture parts	2,936.20	2,079.60	2,403.20	2,836.90	1,330.20
Wood products	8,972.50	11,977.30	12,301.60	14,150.50	6,890.10
Utensils made of wood	2,898.50	3,732.80	3,574.30	4,466.80	2,122.10
Construction articles made of wood	2,634.10	3,385.10	4,204.50	4,568.60	2,380.10
Wood picture frames	2,835.90	4,079.70	3,756.70	4,213.30	1,900.50
Carvings and decorations made of wood	604.20	779.70	766.10	901.80	487.40

(1) Source : Department of Business Economic

(2) Between Jan. - Jun.

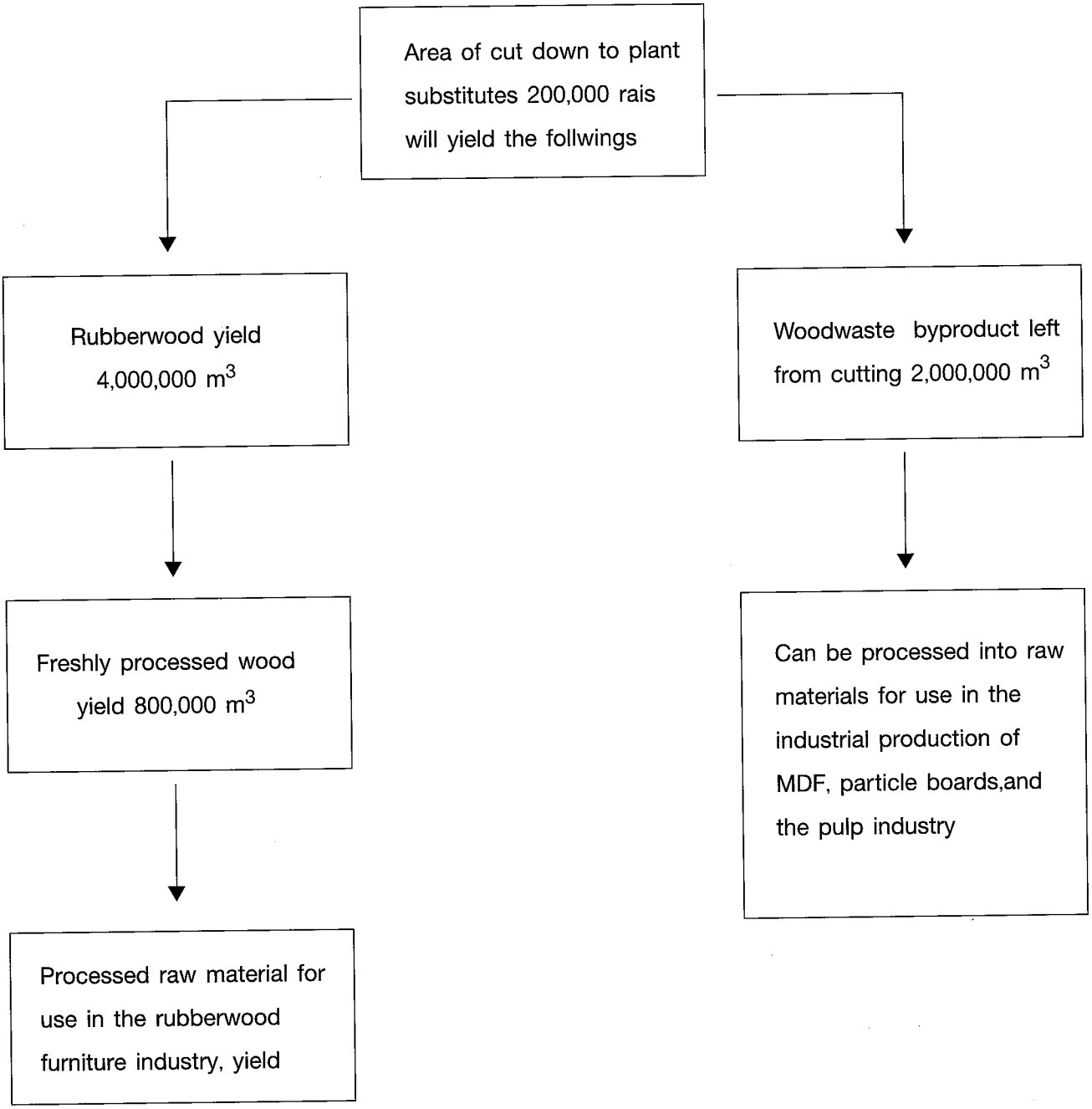

Figure 1 Chart of the rubberwood yields from an area to plant substitutes of 200,000 rais with the number of rubber trees 70 - 80 trees per 1 rai.

High-Wood-Content Rubber Strains : Another Alternative for the Agriculturers

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During the past interval of several years, rubber has been an agricultural commodity which generated the 2nd most export income for the country, next to rice. Eventhough between the years 1998 -1999 the export value had quantitatively declined as a result of the economic problem, but between the years 1999 - 2000 (Jan. - Nov.) the export value had increased by as mush as 17.6 percents, to a total combined value of 116,272 million bahts, which comprised the export value of natural rubber in the raw material forms of 54,757.3 million bahts, the export value of rubber products of 38,492.7 million bahts, and rubberwood products of 23,085 million bahts (Table 1).

Table 1 Export Values of Rubber and Rubberwood Products Between the Years 1997 - 2000

Type	Value (million bahts)				% Increase/Decrease		
	1997	1998	1999	2000	1997-1998	1998-1999	1999-2000
Rubber	55,550.5	55,412.9	43,941.7	54,575.3	- 0.97	- 20.70	+ 24.6
Rubber products	25,056.5	35,666.1	33,109.5	38,429.7	+ 42.35	- 7.16	+ 16.1
Rubberwood products	22,656.3	17,770.6	21,682.7	23,085.7	- 21.57	+ 22.01	+ 6.5
Total	103,263.3	108,849.6	98,733.3	116,090.7	+ 5.41	- 10.3	+ 17.6

Source : Commercial Economic Information Center, Department of Business Economic
(as referenced by Supaporn and Anek, 2000)

By the increased export quantities mentioned above, it can be seen that the export value of the rubberwood products is increasing steadily every year, and 80 percents of the rubberwood products exported are finished furniture with the important importing countries being Japan, U.S.A., and certain European countries. From the Master Plan of Royal Forest Department, it has also been estimated that the demand of rubberwood and rubberwood products will increase from 4.53 million cubic meters in the year 1997 to 6.65 million cubic meters by the year 2007 (Table 2). Thus, the

rubberwood industry still has the potential to develop much further in the future as a result of both the deficiency of other types of wood and the properties of rubberwood which had an intermediate level of hardness, a white or yellowish color, and a beautiful wood grain similar to teak, and is accepted as "white teak".

Table 2 Demand of Rubberwood Products between the Years 1997 - 2007(1)

Type of Product	Volume (million cubic meters)		
	1997	2002	2007
Sawed rubberwood	2.24	2.49	2.77
Plywood & veneers	1.44	1.82	2.18
Fiberboards	0.29	0.43	0.57
Particleboards	0.56	0.83	1.13
Total	4.53	5.57	6.65

(1) Source : Forest Master Plan 1993, Royal Forest Department

Table 3 Estimated Output of the Wood during the Years 1998 - 2001(1)

Year	Area of Felling to Replant (rais)	Wood Volume(2) (million cubic meters)	Processed Wood Volume (million cubic meters)
1998	195,500	3.25	1.07
1999	183,844	3.06	1.01
2000	117,956	2.96	0.97
2001	205,331	3.42	1.12

(1) Source : Royal Forest Department, Office of Replanting Aid Fund (2000)

(2) The wood volume is calculated from 16.6 cubic meters/rai.

(3) The processed rate is calculated as 33 percents.

However, one problem essential to the development of the rubberwood products industry is the rubberwood which is a raw material of limited availability and quality for the following reasons :

- 85 percents of the rubber plantation area are in the Southern Region where transportation is arduous. The rainy season is particularly troublesome to supply the raw material to the plants. After felling, the rubberwood must be quickly sent to the plants in order to prevent the problem of quality deterioration from molds and insects.

- The cutting down of the rubber trees is done by simple methods with existing equipment, and there is a lack of skill. In collecting the wood products, attention is paid to the larger timber. The smaller timber which could be use in other products such as fiberboards, plywood, or particle boards are burned away in the fields or used as fuel wood. In addition, the proportion of the processed wood for use in the products is at a low level. Particularly, the ratio of the small plants is only 20 percents, and the ratio of the medium side plants are 30 - 35 percents. Only the large plants can process the wood for use up to a ratio of 80 percents.

- The planting of rubber today has turned to the replanting with high yield latex hybrids, but the rubber trees are smaller with a low level of branching, resulting in low timber volume. This limits the processing into furniture which is a products of high value. 68 percents of the rubber plantation area are planted with the clone RRIM 600.

In addition, the Board of Natural Rubber Policy, Ministry of Agriculture and Cooperatives, had set the policy to expand the rubber plantation area of the country to non more than 12 million rais in order to reduce the rubber supply in correspondence with the world rubber demand according to the Strategic Plan of Fully Integrated Rubber Development (1999 - 2003). From the said Policy, it is expected that the available volume of the rubberwood will be insufficient for the rubberwood industry in the future. Although there is a problem of depressed rubber price, the price of rubberwood has reversely risen, prompting some owners interest in the planting of rubber for the wood yield as the primary objective, whereas the latex yield would be the secondary objective, having significance as a source of income while waiting to cut down. Thus, rubber strains would be a very important means to satisfy such objectives.

The development of high yield latex hybrids are introduced to the owners in a principle research work which the Rubber Research Institute has always emphasized, recognizing well that planting with good rubber strains will enable the owners to obtain higher output using lower expenses than other methods. The development of rubber strains has been conducted since the years 1954 - 2000, using the conventional breeding method, and includes the import of foreign rubber clones, the collection of native rubber clones from various source, the breeding of rubber clones, and the selection of rubber clones,

which are the principle procedures in improving the rubber clones As a result of the previous research the Rubber Research Institute has developed the new hybrids. Systematic improvement of the rubber clones was started since the year 1965. Around that time, rubber research centers were established, and the improvement of rubber clones by the breeding and clones selection method was started. Rubber clones were also exchanged with the foreign countries and brought to test for adaptability in various environments. From these works, the Rubber Research Institute has issued the promotion of Rubber hybrids for the agriculturers to plant altogether 11 issues from the study of rubber clones in the Rubber Research Institute's series 200 300 400 500, and recently has issued the promotion of Rubber hybrids Rubber Research Institute 251 which is the new highest yield.

Rubber clones with High Latex Yields

These rubber clones are suitable for planting where the latex yield is desired as the primary objective. The yield would be in the range between 293 - 477 kilograms per rai per year (Table 4). In the advisement of Rubber clones, 1999, the advisement clones for the agriculturers to plant include the followings :

1st Class rubber clones	:	Rubber Research Institute 251, Songkhla 36, BPM 24, PR 255, RRIM 600
2nd Class rubber clones	:	Rubber Research Institute 226, Rubber Research Institute 250, RRIC 100
3rd Class rubber clones	:	Rubber Research Institute 163, Rubber Research Institute 209, Rubber Research Institute 214, Rubber Research Institute 218, Rubber Research Institute 225, Haiken 2, PR 302, PR 305

Table 4 The Yields of Various Rubber Strains within the Group of High Yield clones[1]

Rubber Strain	Extraction Year (kilograms per rai per year)										
	1	2	3	4	5	6	7	8	9	10	Average
High class rubber clones											
Rubber Research Institute 251	275	423	459	484	426	712	511	454	498	532	477
Songkhla 36	184	273	315	329	338	355	355	367	398	379	329
BPM 24	311	360	325	286	321	307	304	298	352	352	322
PB 255	209	295	272	319	315	346	356	409			315
PR 255	218	280	299	335	312	357	317	285	321	256	318
RRIM 600	218	231	267	291	314	336	336	325	364	319	295
2nd Class rubber clones											
Rubber Research Institute 226	211	281	296	323	352						293
Rubber Research Institute 250	258	284	293	324	329	401	377	326			324
PRIC 101	270	292	315	229	318	311	299	364	347	383	318

(1) Source : Rubber Research Institute, 1999.

Rubber Strains with High Latex and Wood Yields

These strains provide latex yield in the range between 302 - 318 kilograms per rai per year and have a high wood content of 58.7 - 67.32 cubic meters per rai (at different ages) as shown in Table 5, which are higher than the strain RRIM 600 which provides a latex yield of 295 kilograms per rai per year and a wood volume of 19.3 cubic meters per rai. These clones are contained in the advisement of 1999, including the clones PB 235, PB 260, RRIC 101, RRIC 110.

Rubber Strains with High Wood Yields

The distinct characteristics of this group of rubber strains are high wood yield in the range between 52.14 - 81.18 cubic meters per rai (at different ages), but an intermediate or rather low level of latex yield in the range between 228 - 243 kilograms per rai per year (Table 5). They include the strains AVROS 2037, BPM 1, RRII 118, RRII 203.

As for the long term guideline, the Rubber Research Institute has set a policy to accelerate the development of new rubber hybrids in order to obtain the strains to be recommended for the agriculturers planting according to the different objectives as follows :

• Rubber strains with high latex yields providing an average yield in a 10 year extraction period of not less than 350 kilograms per rai per year.

• Rubber strains with high latex and wood yields providing an average yield in a 10 year extraction period of not less than 300 kilograms per rai per year and a wood yield of not less than 55 cubic meters per rai.

• Rubber strains with high wood yields providing a wood yield of not less than 65 cubic meters per rai.

Table 5 Average Latex Yields, Circumferences, and Wood Contents of Various Rubber Strains in the Last Stage Rubber Strains Comparison Fields

Strain	Age	Dry Rubber Yield (kilograms /rai/year)	Circumference (cm)	Volume of Timber/Tree(1) (cubic meters)	Volume of Branches /Tree	Total	Volume of Wood/Rai (cubic meters)
High latex and wood yields clones							
PB 235	15	312	79.4	0.56	0.33	0.89	58.74
PB 260	15	312	75.7	0.53	0.30	0.83	54.78
RRIC 110	19	318	85.6	0.57	0.45	1.02	67.32
High wood yields clones							
AVROS 2037	19	234	88.7	0.60	0.63	1.23	81.18
BPM 1	19	236	84.9	0.58	0.62	1.20	79.20
RRII 118	13	228	73.6	0.38	0.36	0.74	48.80
RRII 203	13	243	72.5	0.37	0.42	0.79	52.14
Comparative clones							
RRIM 600	17	5.0	73.7	0.30	0.62	0.92	60.70

(1) The part of timber is calculated from the level of the trunk 10 cm high from the ground to the first branch.

From the targets which have been set, the Rubber Research Institute began to breed new rubber hybrids since the year 1988 onward. Up to the year 2000, hybrids of 16,468 clones have been obtained and are being tested. Preliminary test results have shown that, of the hybrids obtained from the rubber breeding in the year 1992 which were experimentally planted in the first stage rubber clones comparison fields at the Burirum Rubber Experimentation station, several clones have larger or similar size of trunks compared to rubber clones of the RRIM series 2000 which the Malaysian Rubber Research Institute has classified as recommended strains with high latex and wood yields (latex timber clones) in the latest edition of the Recommendation of Rubber Strains (1998 - 2000). For examples, the clones RRI - CH - 35 - 1299, OP - CH - 35 - 2010, and RRI - CH - 35 - 1403 have larger circumference than the clones PB 260 by as much as 15.2 - 21.2 percents, as shown in Table 6. in addition to having good growth, these hybrids also possess other desirable characteristics such as a uniform size of trunks from tree to tree, straight trunks, few buddings, high branches of intermediate size, balanced foliages and branching. Thus, these hybrids have the potential to become the clones planted for the wood yield in the future.

Summary

In the future, the demand for rubberwood will increase, particularly those of the furniture manufacturing plants. The old rubber plantations must be felled and replanted with new rubber plants Therefore, the presently existing clones with the potential of latex and wood yields such as PB 235, PB 260, and AVROS 2037, etc., should be considered.

As for the 10 clones of the Thai rubber hybrids, RRI - CH - 35 - 1299, OP - CH - 35 - 2010, RRI - CH - 1156, RRI - CH - 35 - 1385, RRI - CH - 1292, OP - CH - 35 - 2019, RRI - CH - 1397, RRI - CH - 35 - 1403, RRI - CH - 1396, RRI - CH - 35 - 1363, which are clones of better or similar growth to the Malaysian latex timber clones at the same age, it is necessary to wait a further period before collecting the experimental results.

Table 6 The Growth of Certain clones of the Thai Rubber clones Series RRIT 400 Compared to the Malaysian Rubber clones Series RRIM 2000 at the Age of 2 - 3 Years

Sequence Number	Thai Rubber clones[1]	Circumference (cm)			Percents	Malaysian Rubber clones[2]	Circumference (cm)			Percents
		2 Years	3 Years	2-3 Years			2 Years	3 Years	2-3 Years	
1	RRI-CH-35-1299	18.0	30.3	12.3	121.2	RRIM 2004	15.3	26.1	10.8	107.9
2	OP-CH-35-2010	17.5	29.2	11.6	116.8	RRIM 2008	13.7	26.0	12.3	107.4
3	RRI-CH-35-1156	17.4	78.9	11.5	111.2	RRIM 2011	15.5	26.7	11.2	110.3
4	RRI-CH-35-1292	18.3	26.4	10.1	105.6	RRIM 2012	15.7	27.5	11.8	113.6
5	OP-CH-35-2019	17.9	28.4	11.0	113.6	RRIM 2015	15.6	27.5	11.9	113.6
6	RRI-CH-35-1397	17.7	27.9	10.2	111.6	RRIM 2017	14.6	26.6	12.0	109.9
7	RRI-CH-35-1385	16.9	28.4	11.5	113.6	RRIM 2018	15.7	28.1	12.4	116.1
8	RRI-CH-35-1403	16.8	28.8	12.0	115.2	RRIM 2019	15.2	27.0	11.8	111.6
9	RRI-CH-35-1396	17.4	27.9	10.5	111.6	RRIM 2020	15.2	26.4	11.2	109.1
10	RRI-CH-35-1363	17.8	27.4	9.7	109.6	RRIM 901	12.9	23.9	11.0	98.8
11	PB 260	14.6	25.0	10.5	110.0	PB 260	13.8	24.2	10.4	100.0
12	RRIM 600	16.6	24.9	8.4						

(1) Source : Kannikar Terawatanasuk et al.(2000)

(2) Source : PRIM Annual Report (1998)

Current Situation of the Thai Rubberwood Industry in the View of the Department of Export Promotion

Overall Picture of the Furniture and Parts Export

The total export value of furniture and parts up to the month of May, 2005, was 496.08 million U.S. dollars, with a growth rate of 4.79 percents compared to the same period of the year 2004. since the export of furniture from the natural materials, such as bamboo, umbrella plant, Java weed, vine, has received an increased international interest, the growth rate of other furniture was 15.35 percents compared to the same period of the year 2004. Particularly, the U.K. market had a growth rate of 19.84 percents due to the high purchasing power of the market and the satisfaction in the design which appropriately merges the easternness and the westernness.

Export Target of the Year 2005

The value is expected to be 1,455 million U.S. dollars, with an increase from the year 2004 of 20 percents.

Export Trend in the Year 2005

The export value of the furniture and parts merchandises during the first 5 months of the year 2005 was 496.08 million U.S. dollars, with an increase of 4.79 percents compared to the same period of the year 2004. The positive factors came from the furniture merchandise demand being varied according to the construction projects which are increasing in the new markets, such as India, South Africa, Middle East, and the economies of the trading partners, such as the U.S., European Community, Japan, which are improving successively. In addition, the FTA agreement to reduce the rates of import tax on furniture and parts has resulted in a growth rate of 15.79 percents.

The export value of the furniture and parts merchandises in the month of May, 2005, was 106.67 million U.S. dollars, with an increase from the month of April amounting to 15.26 percents, and the export value in the month of June, 2005, is expected to be approximately 91.44 million U.S. dollars.

The export value of the wood furniture merchandises in the month of May was 53.89 million U.S. dallars, an increase from April of 5.05 percents. The proportion of the Thai wooden furniture export amouts to 52.29 percents, and the export value in June, 2005, is expected to be approximately 50.54 million U.S. dallars.

Competitors

The important competitors include China and Vietnam to which the European Community countries are beginning to allocate their production bases because of the cheap labor. In addition, the competitors to be monitored are Malaysia, Indonesia, Taiwan, which have raw materials similar to Thailand and cheap labor, the differences being in the manufacturing skill/design forms.

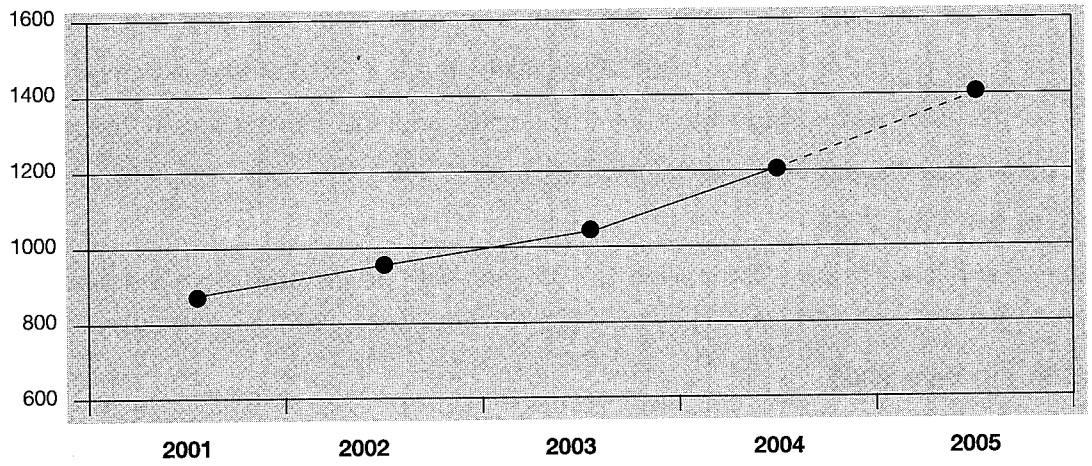
Principle Markets

U.S.A., Japan, U.K., Canada, Australia.

New Markets with High Growth Rates

Indonesia, Ireland, Denmark, Philippines, Malaysia.

Graph of the Furniture Export (Million U.S. Dollars)



Problems and Obstacles

1. The price of the hot rolled steel used in furniture production has risen greatly.

2. The rubberwood is deficient due to the increased export of processed rubberwood to the neighboring countries, particularly with price and product form competition.

3. The import tax structure of the raw materials, such as glues, chemicals, are at high rates.

4. The import rules and regulations of the U.S. and Europe are stricter, making the small exporters unable to adjust the production to comply with the new regulations in a short time.

Strategy

1. Design and produce furniture for the group of senior citizens in the developed countries with high purchasing power.

2. Build the image of Thailand as the hub of furniture merchandise export market in Asia through the TIFF exhibition and the media/other marketing promotion activities.

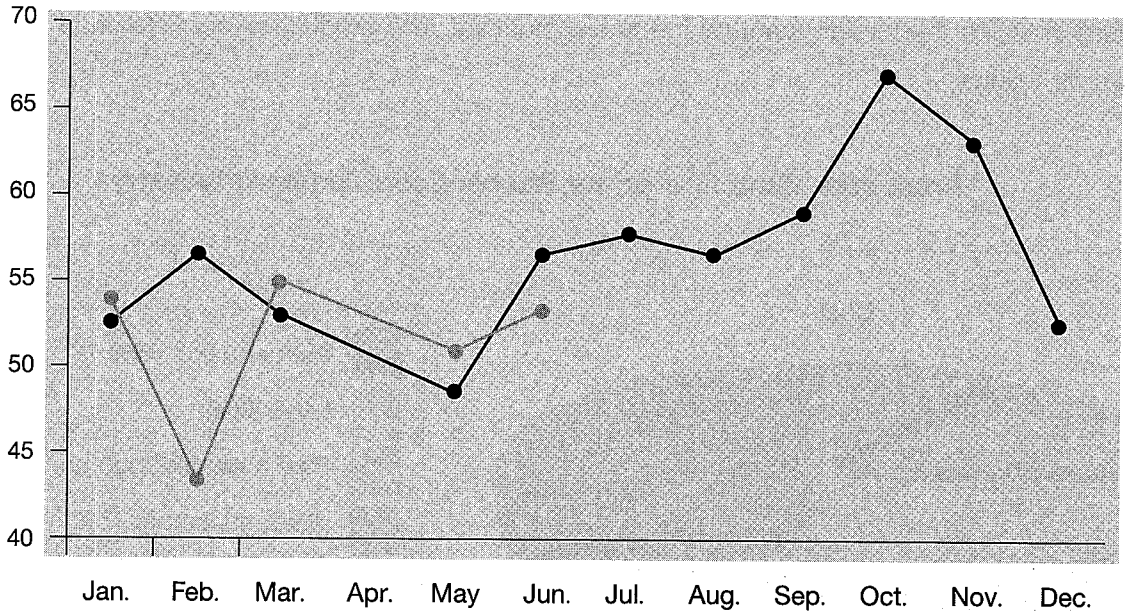
3. Develop the furniture merchandises as to the form, material, utility, quality.

4. Create product differentiation in the niche markets by emphasizing the form, brandname.

5. Adjust the raw material import tax structure and increase the rubberwood export tax levy.

6. Propel and penetrate the new markets with potential and high purchasing power, build networks/ support the whole system of associated industries.

Summary of the Furniture and Parts Merchandises Export Situation as of the Month of May, 2005



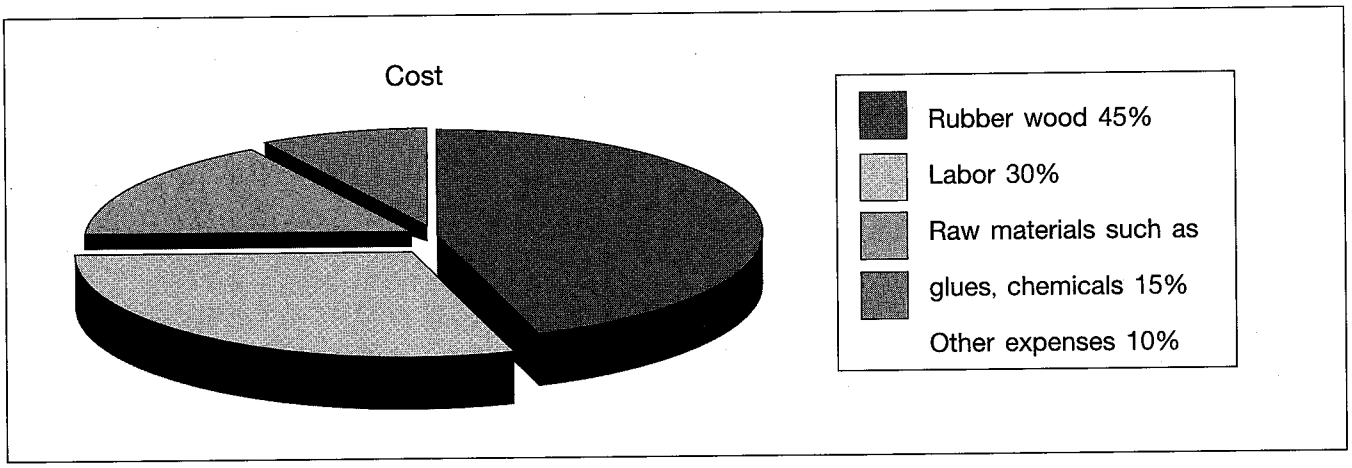
Important Export Markets

	Value : Million U.S.$			Growth rate : Percents			Proportion : Percents		
	2003	2004	2005 (Jan.- May)	2003	2004	2005 (Jan.- May)	2003	2004	2005 (Jan.- May)
1. U.S.A.	351.47	435.07	151.85	2.98	23.79	-8.91	33.81	35.89	30.61
2. Japan	317.98	318.91	133.51	6.73	0.29	0.60	30.59	26.30	26.91
3. U.K.	89.96	119.03	55.61	18.94	32.32	17.26	8.65	9.82	11.21
4. Canada	43.47	46.53	13.222	9.13	7.03	-26.56	4.18	3.84	2.66
5. Australia	27.38	31.24	11.46	-11.00	14.08	6.17	2.63	2.58	2.31
6. Germany	21.83	24.61	8.95	33.99	12.75	-10.10	2.10	2.03	1.80
7. Indonesia	3.08	10.09	8.33	-1.45	18.96	288.06	1.12	1.14	1.68
8. The Netherlands	13.49	14.48	7.99	62.21	7.30	52.82	1.30	1.19	1.61
9. Malaysia	10.48	12.99	7.58	10.25	32.45	37.87	0.97	1.11	1.53
10.Italy	11.31	13.50	6.90	18.27	19.34	38.58	1.09	1.11	1.39
Total of 10 countries	**898.60**	**1,030.55**	**405.38**	**6.91**	**14.68**	**0.22**	**86.45**	**85.00**	**81.71**
others	**140.79**	**181.85**	**90.76**	**16.31**	**29.16**	**29.79**	**13.55**	**15.00**	**18.29**
Grand Total	**1,039.39**	**1,212.40**	**496.14**	**8.09**	**16.65**	**4.58**	**100.00**	**100.00**	**100.00**

Production Structure

The Thai wooden furniture industry mostly comprises the production of furniture ftom rubberwood in the mode of hired manufacturing according to the clients' orderw which specify the forms, and manufacturing in which the foreign furniture forms are modified. The production cost structure is proportioned as follows:

Production Structure of the Rubberwood Furniture Industry



As for the Thai wooden furniture mostly exported, approximately 60 percents are produced from the rubberwood. The remaining 40 percents are produced from wood panels which had passed through technical processes such as plywood and particle boards (30 percents), and from hardwoods such as Ching Chang, Pra Due, and Teng (10 percents). Most of the wood furniture produced for export can be characterized as the knock down type, such as dining room collections, living room collections, shelves, etc.

The season that renders the export value of the rubberwood furniture higher than order types of wood is due to the fact that on January 15, 1989, the government had issued a Logging ban in the whole of the country. Since then, the problem of hardwood deficiency was happened Hardwood, whether teak, Ching Chang, Pra Due, and various diversed woods were hard to find, must be imported from the foreign countries, and were expensive. Thus, rubberwood, which had not been previously utilized and were discarded after planting for the latex benefit, became the economic wood most popular for the production of export furniture. Since the wood is readily available in the country, has an intermediate durability, combined with the properties of rubberwood which has beautiful grain, can be dyed and decorated, is of light weight and low price, the rubberwood furniture has become highly popular in the foreign markets, especially the Japan market.

However, during the past few years, entrepreneurs in the Thai rubberwood furniture manufacturing industry are experiencing the problem of raw material shortage since many Thai rubberwood planters have increased the export of rubberwood to the competing countries, namely Malaysia, China and Vietnam.

Export of Furniture to Japan

Overall Market Condition

During the past 4 - 5 years, there has been a trend towards a new life style which emphasizes the use of goods and the conduct of life unhurriedly to compensate for the rapidity of the technological change, the avoidance of chemicals, and the approach to nature. An important selling point which has become popular is "relaxing & healing". This is a new marketing trend, called "Slow life", which reverts back to the old cultures and emphasizes the quality of life. In the selection of goods, the buyers will be interested in the forms which provide a harmonious, friendly feeling (human friendly designs) with such key points as :

- Non edges, organic shape design - There should be no dangerous sharp edges.
- Monotone & oriental - there is ma reversion to appreciate the light tone color for bright, comfortable look. The best selling colors include light brown, soft white. This appreciation also encompasses Asian style wooden furniture with natural wood color.

Japan's Furniture Import

In the year 2004 (January - December), the total value of Japan's furniture and parts import from foreign Countries was 3,703.16 million U.S. dollars, an increase from the previous year of 10.20 percents. The value of import from Thailand was 340.27 million U.S. dollars, an increase from the previous year of 3.67 percents. Most of this was wooden furniture (256.98 million U.S. dollars), followed by furniture parts, metal furniture, and other furniture, respectively. Thailand has a market share of 9.19 percents.

Presentation Tactics

The furniture market in Japan is highly competitive, while the domestic producers are striving fully to adapt themselves in order to compete against the severe competition from imported goods. The Japanese consumers have high incomes and nearly complete facilities for daily living, such as to be

almost in excess of life's basic necessities. Thus, the merchandise which can arouse the attention and attract the consumers to spend the money to buy must be interesting and, importantly, must be sufficiently differentiated in the eye of the consumers. Such circumstance has prompted the furniture producers and traders at all levels in Japan to adjust the production and the marketing tactics discernibly and incessantly in order stimulate the consumers desire to buy.

On the production side, the domestic producers are emphasizing the production of furniture according to their adeptness and expertise, placing the highest importance on the improvement of design and quality ; emphasizing the production of goods in the manner of Original Design Manufacturing (ODM), the creation and elevation of their merchandise brands image, and the collaboration with the furniture producers of other types, which they themselves do not produce or do not have the expertise, in order to simultaneously present the products to the market together in the fashion of "total" life style which will increase the potential of the goods in the eye of the consumers.

On the selling side, the furniture traders in Japan are currently also emphasizing the tactic of presenting new life styles to the consumers, by helping the consumers think of the way to use the merchandise or providing a guideline as to the method to apply or to decorate in their daily life as well. Thus, the presentations, whether in store displays or in various sale promotion advertisings media, are no longer the presentation of single merchandise designs as formerly practiced, but are usually the presentation of furniture series with several household decorative items in particular scenes, such as the bedroom lifestyle, living room lifestyle, etc., in order to render the merchandises more interesting and help the consumers to decide to buy easier and faster.

Expanding the Japan Market

To succeed in the penetration and expansion of the Japan market, the important factor is to emphasize the quality. Various defects, such as untidy sewing, loosely assembled parts, uneven substrate color, scratches, inadequate drying, making the wood split or warp with the difference in temperature, will result in the furniture being considered defective goods. Thus, to export furniture merchandises to the Japan market, there must be good quality control.

1. The Thai manufacturers/exporters should consider the improvement of furniture design to attain the features and quality required by the Japan market. The design competition is becoming more important with each passing day. The Japanese consumers like furniture of good form and quality, modest size suitable for residential use, and high utilities.

2. To penetrate and expand the Japan market, there must firstly be an emphasis on good, standard quality. Second is the emphasis on applicational safety, and utilities.

3. Since the future trend is that the Japanese senior citizens will continue to increase, the Thai manufacturers/exporters should develop the form and utilities of the furniture that will be produced to suit senior citizens' use by emphasizing the ease of use, high utilities, and applicational safety.

4. The rubberwood furniture has received an increasing popularity in the Japan market. Thai rubberwood is of better quality than the rubberwood from Malaysia and Indonesia, whereas China has very little and must import the rubberwood. To help the Thai manufacturers/exporters, it is essential to erect a tariff barrier against the export of rubberwood raw material and to suspend the promotion of foreign investment opening sawmills in Thailand.

Summary and Suggestions

The furniture market in Japan is always in flux, which is not different from other types of fashion goods. The period of consumers' inconfidence in economic stability and the trend of approaching senior citizens society have made the Japanese reluctant to spend, weary of cheap price, low quality goods, and delay spending. At the same time, both domestic and foreign producers each has brought new tactics into play in order to compete for market share. It can be said that price is not the main factor. A successful merchandise must combine the advantages over the competitors of both utility and the buyers' sensation. To expand the Japan market effectively, the manufacturers must clearly define the targeted group of buyers and the selling channel. The group of buyers desired to penetrate might be, for example,

- The mass product market where large quantities can be sold, but must meet stiff competition from cheap goods, particularly from China and Vietnam, which are being developed rapidly as to both the form and quality, have short delivery time, and are of cheap price, or

- The upper market, for this group of merchandises, there must be an emphasis on novelty by creating a "concept". The buyers will choose to buy based on their impression and satisfaction in the concept or a special form, which is buying because of pride in the merchandise. Thus, they will be willing to pay a lot money, and price is not the main factor.

On the cooperation with renowned designers with their own trading networks and accepted in the trading circles and by the buyers is an alternative for quicker success. In the meanwhile, it is about time that the manufacturers and exporters must make their commodity brands and identities. This might initially tyke time and high investment, as well as devoted studies of the popular market trend of new life styles and the requirements of the targeted group of buyers, but the merchandises would be elevaled out of the traditional markets, leading to a competition to enter into the market lastingly.

Exports of the Relevant Thai Merchandises In the Years 2001 - 2005 (Jan - May)

Item	2001		2002		2003		2004		2004 (Jan - May)		2005		2002	2003	2004	2005
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value				
Furniture and parts	-	38,445.9	-	41,237.0	-	43,192.6	-	48,461.4	-	18,469.8	-	19,187.0	7.3	4.7	12.2	3.9
Wooden furniture	35,331	22,383.3	46,000	24,018.4	41,435	24,373.4	41,356	22,557.3	16,668	10,462.7	14,499	10,033.3	7.3	1.5	13.1	-4.1
Metal furniture	-	4,204.2	-	3,900.4	-	3,399.2	-	3.042.6	-	733.6	-	1,157.2	-7.2	-13.1	-10.3	-6.0
Mattresses, pillows, cushions	-	1,513.6	-	1,938.6	-	1,760.1	-	3,059.6	-	4,018.3	-	931.8	28.1	-9.2	12.0	26.2
Other furniture	-	7,625.6	-	8,199.9	-	9,339.2	-	10,671.3	-	2,051.8	-	4,658.7	7.5	13.9	14.3	15.9
Furniture parts	20,476	2,720.1	29,899	3,179.7	33,664	4,329.6	35,503	5,230.6	14,933	18,4699	14,807	2,402.2	16.9	36.2	18.5	18.5
Wood and wood products (44)	-	23,308.3	-	28,875.9	-	29,854.8	-	36,211.9	-	13,305.8	-	14,684.5	13.2	3.4	21.3	10.4
Processed wood (cubic meters)	408	2,396.0	1,367	4,248.4	1,972	6,074.8	4,416,215	8,444.9	638	3,189.9	484	3,313.3	77.3	43.0	38.9	3.9
Veneers	1,539	369.5	1,483	352.6	1,319	332.9	1,725	364.4	809	163.6	580	142.2	-4.6	-1.2	7.9	-12.8
Plywood	321,731	2,383.1	299,306	2,3.7.8	282,235	2,123.4	5,63,806	4,368.3	140,262	1,100.3	332,775	2,236.3	-3.2	-8.0	106.7	105.1
Fiberboards	302,348	2,929.6	391,431	3,882.5	401,881	3,990.8	415,194	4,847.7	168,732	1,749.0	171,393	1,966.4	32.8	0.5	18.0	12.4
Utensils made of wood	46,366	4,561.4	63,571	4,915.6	50,272	4,630.9	45,619	4,363.6	12,834	1,641.9	16,497	1,313.7	2.8	-5.8	-8.7	-3.2
Construction articles made of wood	73,920	4,320.9	73,592	4,391.4	72,667	4,523.9	73,805	4,847.8	27,973	1,783.3	30,595	1,963.8	-2.6	3.0	7.5	10.1
Wooden picture frames	26,349	4,119.9	31,388	4,399.0	34,856	3,907.0	32,626	4,.57.2	11,873	1,516.5	11,613	1,474.6	8.8	-11.2	9.0	-2.8
Sculptures and decorations made of wood	7,483	3,445.5	9,811	1,318.2	11,811	1,514.3	12,120	1,784.5	5,139	699.3	6,350	683.8	15.1	15.7	12.0	4.9
Other wood and wood products	207,343	2,811.8	836,550	3,050.7	726,22	2,831.0	699,327	3,172.8	362,003	1,462.3	281,418	1,376.1	6.2	-7.5	12.3	-8.9

Activities to Promote and Improve the Export of Furniture and Parts Merchandises, Budget Year 2005

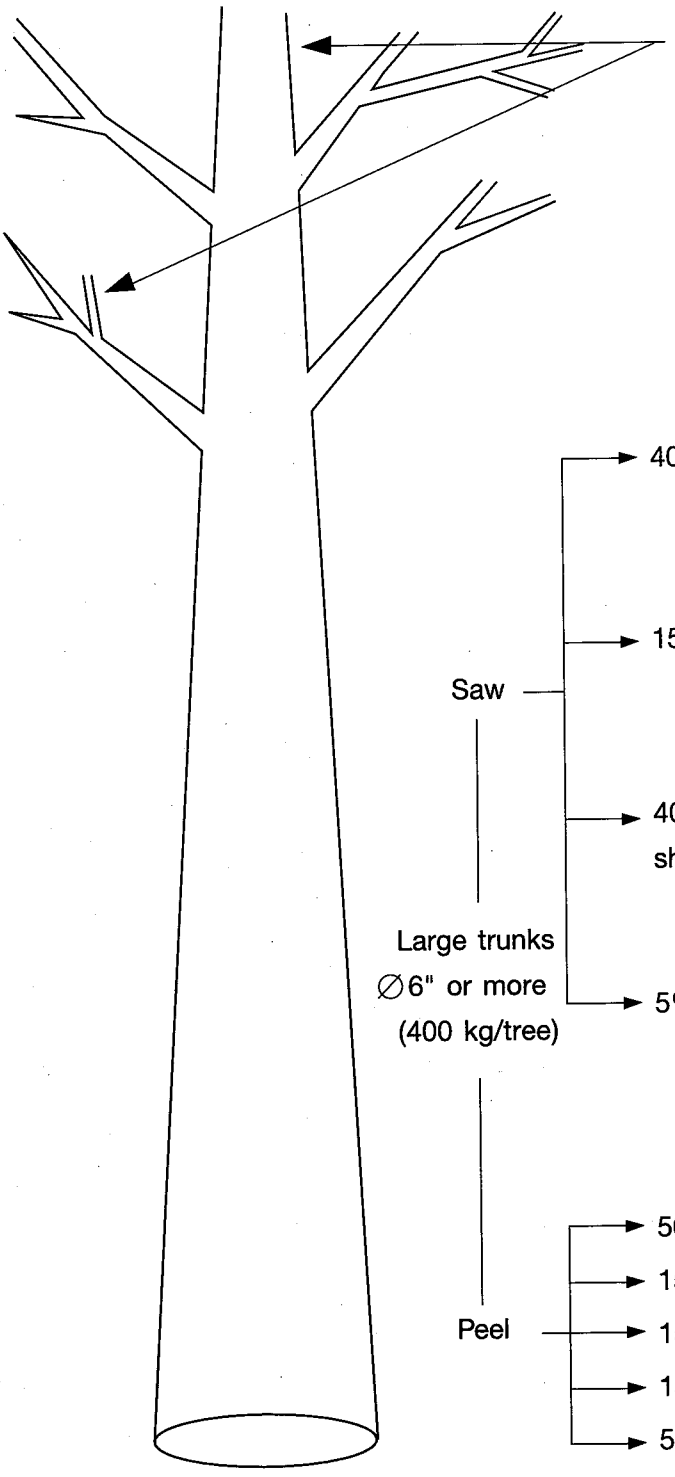
Strategy	Project Name	Market	Period of Operation
1.Offensive Market Development	1 domestic exhibition - International Furniture Fair (TIFF)2005		Mar. 4 - 6, 2005 (Business negotiations) Mar. 7 - 8, 2005 (Retail sales)
	Foreign exhibitions		
	1. Internatinal Home Furnishing Market (High Point)	U.S.A	Apr.14 - 20, 2005
	2 .Index, Dubai 2005		
	3. International Furniture Fair Tokyo 2004 (IFFT)	U.A.E.	Nov.28 - Dec.2, 2005
	4. International Furniture Fair Cologne (IMM) 2005	Japnan	Nov.22 - 25, 2005
	5. The Furniture Show 2005, Birmingham	Germany	Jan.17 - 23, 2005
	6. Meble 2005 (Poznan)	U.K.	Jan.23 - 26, 2005
		Poland	May31 - Jun.3, 2005
	Organizing Thai exhibitions in foreign countries (Oct.1,2004 - Sep.30,2005)		
	1.Thailand Exhibition, China, (5times)	China	
	2.Thailand Exhibition, Myanmar, (3times)	Myanmar	
	3.Thailand Exhibition, Cambodia, (2times)	Cambodia	
	4.Thailand Exhibition, Vietnam, (2times)	Vietnam	
	5.Thailand Exhibition, Bangladesh, (2times)	Banglades	
	6.Thailand Exhibition, India, (5times)	India	
	7. Thailand Exhibition, U.A.E	U.A.E.	
	8. Thailand Exhibition, S.Africa	S.Africa	
	9. Thailand Exhibition, Turkey	Turkey	
	10. Thailand Exhibition, Ghanan	Ghana	
	11. Thailand Exhibition, Russia	Russia	
	12. Thailand Exhibition,Yemen	Yemen	
	13. Thailand Exhibition, Bahrain	Bahrain	
	14. Thailand Exhibition, Oman	Oman	
	15. Thailand Exhibition, USA	USA	
	16. Thailand Exhibition, Indonesia	Indonesia	
	17. Thailand Exhibition, Australia	Australia	
	18. Thailand Exhibition,Lebanon	Lebanon	

Strategy	Project Name	Market	Period of Operation
2.Creating Business Opportunities	- Thailand Plaza Project	USA / UK France/ uae. / Italy Germany china / Japan Bahrain All market	
	- Thailand's Brand Project - PM Award Contest - Development of the Thai furniture designers 2005 (Regional Product Development Project with the works shown in the TIFF exhibition) - Prism Award Project (contest of fabric works for use in furniture organized every 2 years) - G-Mark Contest Project(design award)		
3.Market Intelligence	- Study and follow furniture and parts trading situations in important export markets and new markets with good export trends by the Thai trade promotion offices in foreign countries.	All Market Italy/Europe	
	- Project of the marketing strategy to generate value added for furniture and household decorative items.		
	- Project to develop the potential of furniture merchandises in order to participate in the IFFT exhibition, Tokyo, 2005 (a project of the ASEAN Center). Export Service office, Department of Export Promotion	Japan	Feb. - Nov., 2005

Summary of the Trading Situation on Rubberwood Furniture and Parts

From the reports of the Customs Department and the Department of Trade Negotiations, it is found that the situation of Thai furniture and parts export to the U.S. market during the first 4 months of the year 2005 is most depressed in the past 10 year cycle, by value. While the Thai furniture and parts are included in the commodity type on an offense in the U.S. market, it has not been very effective eventhough the potential to compete is good to a degree or there still exists an export advantage. Vietnam is considered has continuously increased. It has an advantage over labor skill is rather rapid. The production technology acquired from the foreign investors, including Taiwan, Singapore and the U.S., has resulted in a rapid development of Vietnam's production, including higher quality and more varied commodity forms. At the same time, other competitors, whether China or Indonesia which already possesses higher competitive potential than Thailand, have also continuously increased their competitive capability, widening the gap from Thailand further. This means that the ability to compete and expand the market share of the Thai furniture and parts in the U.S. might be on a downward trend in the future if the Thai entrepreneurs place too little importance on the development of design and production technology, or do not step up the dissemination of their commodity brands to wider circles. During the past several years, it is found that Thailand has a balance surplus against the U.S., but at the same time Thailand must substantially rely on the U.S. market. Each year, the Thai furniture and parts export to the U.S. amounts to a proportion of 30 -35 percents of Thailands total furniture and parts export value, while the U.S. also imports from other sources. All of the important furniture and parts import sources are those competitors which have various advantages over Thailand in lower raw material and labor costs. On the other hand, Italy has an advantage in beautiful and modern design. Hence, the Thai entrepreneurs must seriously and quickly adapt themselves in order to maintain and increase the potential of the Thai furniture and parts to compete and attack the U.S. market, as well as quickly increase the potential to compete and develop the products to penetrate the Japan market which still has the tendency to expand continuously, along with stepping up the search for new markets to substitute the U.S. market, particularly those of the new trading which the government sectors had opened up as free trade markets, whether India, the Middle East countries, China, or Australia. This will alleviate the problem of too much reliance on the U.S. market and stimulate the commodities within the group of Thai furniture and parts on the whole, providing an opportunity to generate increasing incomes in the future.

Every Part of the Rubber Tree Can Be Utilized



Branches (50 kg/tree)
- Particle boards
- Charcoal
- Fuel

Small trunks ∅ 6" or less (150 kg/tree)
- 90% MDF boards
- 10% Bark → Fuel

Large trunks ∅6" or more (400 kg/tree)

Saw
- 40% Proocessed wood
  - Flooring
  - Household utensils
  - Picture frames
  - Furniture
  - Toys
  - Bulding parts
- 15% Packing
- 40% Wood shavings
  - Particle boards
  - Charcoal
  - Fuel
- 5% Sawdust
  - Fuel
  - Mushroom culture
  - Particle boards

Peel
- 50% Veneet Production → Plywood
- 15% Smll veneers → Small furniture
- 15% Veneer waste → Particle boards
- 15% Wood core → MDF boards
- 5% Bark → Fuel

In sum, there are 14 PB producing companies

In the year 2005, there were 14 producing companies

Total production capacity	2,820,000	m^3/year
Total rubberwood consumption	2,820,000	m^3/year

In the year 2004, there were 14 producing companies

Total production capacity	2,136,000	m^3/year
Total rubberwood consumption	2,136,000	m^3/year

In the year 2003, there were 13 producing companies

Total production capacity	1,311,000	m^3/year
Total rubberwood consumption	1,311,000	m^3/year

In sum, there are 5 MDF producing companies

In the year 2003 - 2005, there were 5 producing companies

Total production capacity	980,000	m^3/year
Total rubberwood consumption	1,281,537	m^3/year

In sum, there are 25 plywood producing companies

In the year 2003 - 2005, there were 25 producing companies

Total production capacity	450,000	m^3/year
Total rubberwood consumption	900,000	m^3/year

Obstacles of the plywood, veneers, and board materials industrial group

* Shipping freights are more expensive than the competitors.
* Problem of the Forest Stewardship Council (FSC).
* The Forest law and regulations
* Domestic transportation costs are expensive.

Remark : rubber trees are planted approximately 65 - 70 trees/rai,

1 rai providing 30 -32 m^3 (600 kg x 65 trees/1,300).

Rubber Research Institute 401 (RRIT 401)

This is an open hybrid rubber clones of an unknown PB mother clones, which has excellent growth. At the age of 4 and a half years, the circumference of the trunk is 43.6 centimeters, larger than the comparative clone RRIM 600 by 23.3 percents, and provides a timber wood volume of 0.06 cubic meter per tree, which is more than the comparative strain RRIM 600 by 74.3 percents. The foliage is expansive. Branching is balanced and at a high level. The shape of the trunk is circular and straight, resulting in a large timber wood volume suitable to be used in the furniture industry.

Chachoengsao 50 (RRIT 402)

The former designation Rubber Research Institute 402 (RRIT 402) has been changed to Chachoengsao 50 in order to commemorate the occasion of His Royal Highness the Crown Prince's 50th birthday. This rubber is an open hybrid rubber clone of the RRIC 110 mother clone, which has excellent growth. At the age of 4 and a half years, the size of the circumference is 42.8 centimeters, which is larger than the comparative clone and provides a wood volume 0.07 cubic meter per tree, which is more than the comparative clone RRIM 600 by 97.1 percents. The foliage is substantially expansive. The branching characteristic is balanced branching at a high level. The shape of the trunk is circular and straight, resulting in a large timber wood volume suitable to be used in the furniture industry.

Rubber Research Institute 403 (RRIT 403)

This rubber clone is a hybrid between the clones PB 5/551 and RRIC 101, which has excellent growth. At the age of 4 and a half years, the circumference of the trunk is 42.5 centimeters, larger than the comparative clone RRIM 600 by 20.3 percents, and provides a timber wood volume of 0.05 cubic meter per tree, which is more than the comparative clone RRIM 600 by 40percents. The foliage is expansive. Branching is balanced with the height of branching at an intermediate level. The shape of the trunk is circular and straight.

Rubber Research Institute 404 (RRIT 404)

This rubber clone is a hybrid between the clone PB 5/51 and RRIC 101, which has excellent growth. At the age of 4 and a half years, the circumference is 41.9 centimeters, larger than the comparative strain RRIM 600 by 18.4 percents, and provides a volume of wood 0.05 cubic meter per tree, which is more than the comparative clone RRIM 600 by 45.7 percents . the foliage is expansive. Branching is balanced with the height of branching at an intermediate level. The shape of the trunk is circular and straight.

AVROS 2037

This rubber tree clone is obtained by cross breeding the clones AVROS 256 and AVROS 352, with excellent growth. At the age of 20 years, the circumferential size is 83.8 centimeters, providing a timber wood yield of 0.50 cubic meter per tree and foliage wood 0.65 cubic meter per tree. When young, there are many small branches. The foliage is dense, but the leaves turn over quickly, and the small branches are discarded rather quickly. When old, only 1 - 2 large branches are left at a high level, rendering the

foliage airy. The shape of the trunk is circular and straight, resulting in a large wood volume. Resistances to the diseases of protruding point on the leaves, phytoptora, powdery mold, and pink mold are intermediate. The wind resistance is rather good.

BPM 1

This rubber clone is obtained by cross breeding the clones AVROS 163 and AVROS 308, with excellent growth. At the age of 20 years, the circumferential size is 86.2 centimeters, providing a wood yield of 0.42 cubic meter per tree and foliage wood 0.55 cubic meter per tree. When young, the branching is low with conical shaped foliage of intermediate expanse. The foliage is dense, but the leaves turn over quickly, and the branches are discarded when old, rendering the foliage airy at a high level. The shape of the trunk is circular and straight. Resistances to the diseases of falling leaves, phytoptora are good. Resistances to the diseases of powdery mold, protruding points on the leaves, and pink mold are intermediate. The wind resistance is good.

Table 1 The Growth of Trunks and Wood Volumes of Rubber clones Series RRIT 400 between the Years 1996 - 2002 at the Burirum Rubber Experimentation Station

clone	Mother	Father	Trunk Circumference (centimeters)						Timber Wood Volume (cu.m/tree)	Trunk Circumference (percents)			Timber Wood Volume (percents)		
			2 Years	2.5 Years	3 Years	3.5 Years	4 Years	4.5 Years		BPM24	PB260	RRIM600	BPM24	PB260	RRIM600
RRIT 401	PB unknow		17.4	21.5	28.9	34.5	38.8	43.8	0.061	120.9	121.7	123.3	184.8	156.4	174.3
RRIT 402	RRIC 110		17.8	22.5	29.2	34.5	37.8	42.8	0.069	116.3	119.0	120.7	209.1	176.9	197.1
RRIT 403	PB 551	RRIC 101	16.9	22.0	28.4	33.5	37.3	42.5	0.049	116.0	118.7	120.3	148.5	125.6	140.0
RRIT 404	PB 551	RRIC 101	16.8	22.1	28.7	33.5	37.6	41.9	0.051	116.1	116.8	116.4	154.5	130.6	145.7
BPM 24 1/	GT 1	AVROS 1734	14.5	18.8	23.9	28.9	31.6	36.1	0.003	100.0	100.6	102.0	100.0	64.6	94.3
PB 260 1/	PB 551	PB 49	14.6	19.6	25.0	29.6	32.1	35.8	0.039	99.4	100.0	101.4	118.2	100.0	111.4
RRIM 600 1/	Tir 1	PB 96	16.6	19.9	25.0	29.0	31.6	35.4	0.035	99.1	98.6	100.0	106.1	89.7	100.0

Source : Kannikar et al. (2002)

Remark : 1/ Comparative clone.

Table 2 Incremental Growth of the Trunks of Rubber clones Series RRIT 400 between the Years 1996 - 2002 at the Burirum Rubber Experimentation Station

Clone	Incremental Circumference Every 6 Months (centimeters)						Incremental Circumference (percents)		
	2Years - 2.5Years	2.5Years - 3Years	3Years - 3.5Years	3.5Years - 4Years	4Years - 4.5Years	Average	BPM 24	PB 260	RRIM 600
RRIT 401	4.1	7.4	4.3	9.9	5.0	6.6	121.8	120.7	140.0
RRIT 402	5.0	6.7	3.3	8.6	5.0	6.5	116.9	115.9	134.3
RRIT 403	5.1	6.4	3.8	8.9	5.2	6.6	119.2	118.2	137.0
RRIT 404	5.3	6.6	4.1	8.9	4.3	6.6	116.7	115.7	134.1
BPM 24 1/	4.3	5.1	2.9	7.9	4.3	5.6	100.0	99.2	114.9
PB 260 1/	5.0	5.4	2.5	7.1	3.7	5.5	100.8	100.0	115.9
RRIM 600 1/	3.3	5.1	2.6	6.6	3.8	4.8	87.0	86.3	100.0

Source : Kannikar et al. (2002)
Remark : 1/ Comparative clone.

Rubberwood Data , 2000 - 2004

Product/Market Analysis	Domestic Market size (rai/Baht)	Growth Rate %	Price (Baht/rai) Million Bahts	Growth Rate %	International Market Size (Baht/rai) Million Bahts	Growth Rate %	Price (Baht/rai) Million Bahts	Growth Rate %	Total Market %	Growth Rate %	Price (Baht/Ton) Million Bahts	Growth Rate %
Product : Rubberwood												
1. Rubberwood	9.20	15	4,000	40	-	-	-	-	9.20	20	4,000	40
2. Processed rubberwood	1.80	15	12,600	15	0.62	30	4,330	13	-	22	-	35
3. Particle board	1.01	15	5,000	10	0.55	20	2,735	15	1.56	17.50	7,735	12.50
4. MDF	0.92	15	6,200	10	0.46	20	3,170	8.20	1.38	17.50	9,370	9.10
5. Veneers	0.23	15	2,300	10	0.04	25	426	15	0.27	20	2,726	12.50

Rubber Plantation Area, Output, and Yield per Rai, 1984 - 2005

Year	Plantation Area (Rais)	New Plantation Area (Rais)	Replanting Area (Rais)	Total New Planting (Rais)	Yield Area (Rais)	Raw Rubber Sheet Output (Tons)	Dry Rubber Output (Tons)	Yield per Rai (Kilograms)
1984	10,648,404	46,334	235,035	281,369	8,569,104	781,283	757,845	91
1985	10,694,738	53,950	318,512	372,462	8,418,878	844,070	818,748	100
1986	10,748,688	51,119	265,417	316,509	8,397,109	949,834	921,339	113
1987	10,799,807	49,605	262,526	312,131	8,449,430	1,061,435	1,029,592	126
1988	10,849,412	49,780	274,556	324,336	8,467,863	1,150,722	1,116,200	136
1989	10,899,192	61,444	221,951	283,395	8,541,459	1,309,531	1,270,245	153
1990	10,960,636	60,867	215,868	276,735	8,719,350	1,417,666	1,275,899	163
1991	11,021,503	70,768	240,071	310,857	8,824,036	1,500,012	1,350,011	170
1992	11,124,523	88,084	233,637	321,721	8,871,768	1,712,488	1,541,239	193
1993	11,212,607	95,203	177,346	272,549	9,006,884	1,810,826	1,629,743	200
1994	11,552,131		170,635	239,018	9,618,672	1,988,334	1,789,501	207
1995	11,698,768		177,388	244,770	9,828,115	2,061,792	1,917,467	210
1996	11,767,553		176,745	187,431	9,751,707	2,121,787	1,973,262	218
1997	11,904,152		230,312	269,622	9,741,394	2,168,588	2,060,159	223
1998	12,218,747		230,333	262,403	9,767,559	2,162,899	2,054,754	221
1999	12,408,931		229,605	261,675	9,796,071	2,214,948	2,170,649	226
2000	12,422,720		229,838	261,908	9,525,261	2,377,882	2,330,324	250
2001	12,441,747		229,909	261,979	9,523,721	2,561,180	2,509.956	269
2002	12,525,511				9,710,016	2,631,676	2,579,042	271
2003	12,618,792				10,010,885	2,860,882	2,832,273	286
2004	13,021,265				10,356,714	3,010,000	2,967,860	291
2005					10,749,836	3,143,464	3,112,029	292

Source : Agricultural Public Relations Center, Office of Agricultural Economics

Table 20 Imports of Logs and Sawntimber, 1983-2003

Year	Logs		Sawntimber		Total		Year
	cum.	baht	cum.	baht	cum.	baht	
1983	231,784	716,245,533	398,591	1,569,487,203	630,375	2,285,732,736	1983
1984	199,458	843,003,844	382,032	1,426,110,102	581,490	2,269,113,946	1984
1985	172,100	1,118,640,338	246,140	1,025,761,727	418.240	2,144,402,065	1985
1986	152,714	951,874,105	195,937	1,004,839,045	348,651	1,956,713,150	1986
1987	282,928	1,353,963,087	442,292	2,248,499,583	725,220	3,602,462,670	1987
1988	446,959	2,028,960,990	676,563	3,182,836,527	1,123,522	5,211,797,517	1988
1989	1,193,340	4,120,841,519	1,314,684	6,481,657,712	2,508,024	10,602,499,231	1989
1990	1,847,392	5,647,283,229	1,493,573	8,128,821,902	3,340,966	13,776,105,131	1990
1991	1,747,201	6,814,568,759	1,533,611	9,259,803,337	3,280,812	16,074,372,096	1991
1992	2,036,090	7,247,763,622	1,778,349	11,067,912,960	3,814,439	18,315,676,582	1992
1993	1,366,719	5,903,670,625	1,801,516	12,899,516,903	3,168,235	18,808,187,528	1993
1994	1,548,899	7,408,062,223	2,516,847	16,321,877,976	4,065,746	23,729,940,199	1994
1995	1,377,869	10,026,642,537	2,085,687	16,991,234,838	3,463,556	27,017,877,375	1995
1996	936,300	6,310,432,004	2,215,538	17,208,144,967	3,151,838	23,518,576,971	1996
1997	895,545	5,435,393,086	1,463,081	13,198,549,300	2,358,626	18,633,942,386	1997
1998	278,076	2,095,106,431	961,617	6,824,832,707	1,239,693	8,919,939,138	1998
1999	468,501	3,638,126,117	1,254,999	7,644,708,893	1,723,500	11,282,835,010	1999
2000	487,368	5,064,972,766	1,027,082	9,451,530,958	1,514,450	14,516,503,724	2000
2001	516,860	4,355,185,838	1,285,470	10,912,118,116	1,802,330	15,267,303,954	2001
2002	614,352	3,876,815,790	1,924,568	12,531,216,037	2,565,920	16,408,031,827	2002
2003	380,105	4,138,685,536	1,660,290	13,612,519,043	2,030,395	17,751,204,579	2003

Report on the Development of

The Thai Rubberwood Industry

Promotion of the Thai Rubberwood Industry in the Years 2002-2005

By

Forest Management and Forest Products Research Office

Royal Forest Department Ministry of Natural Resources and Environment