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Forest Products Sector Profile of Taiwan

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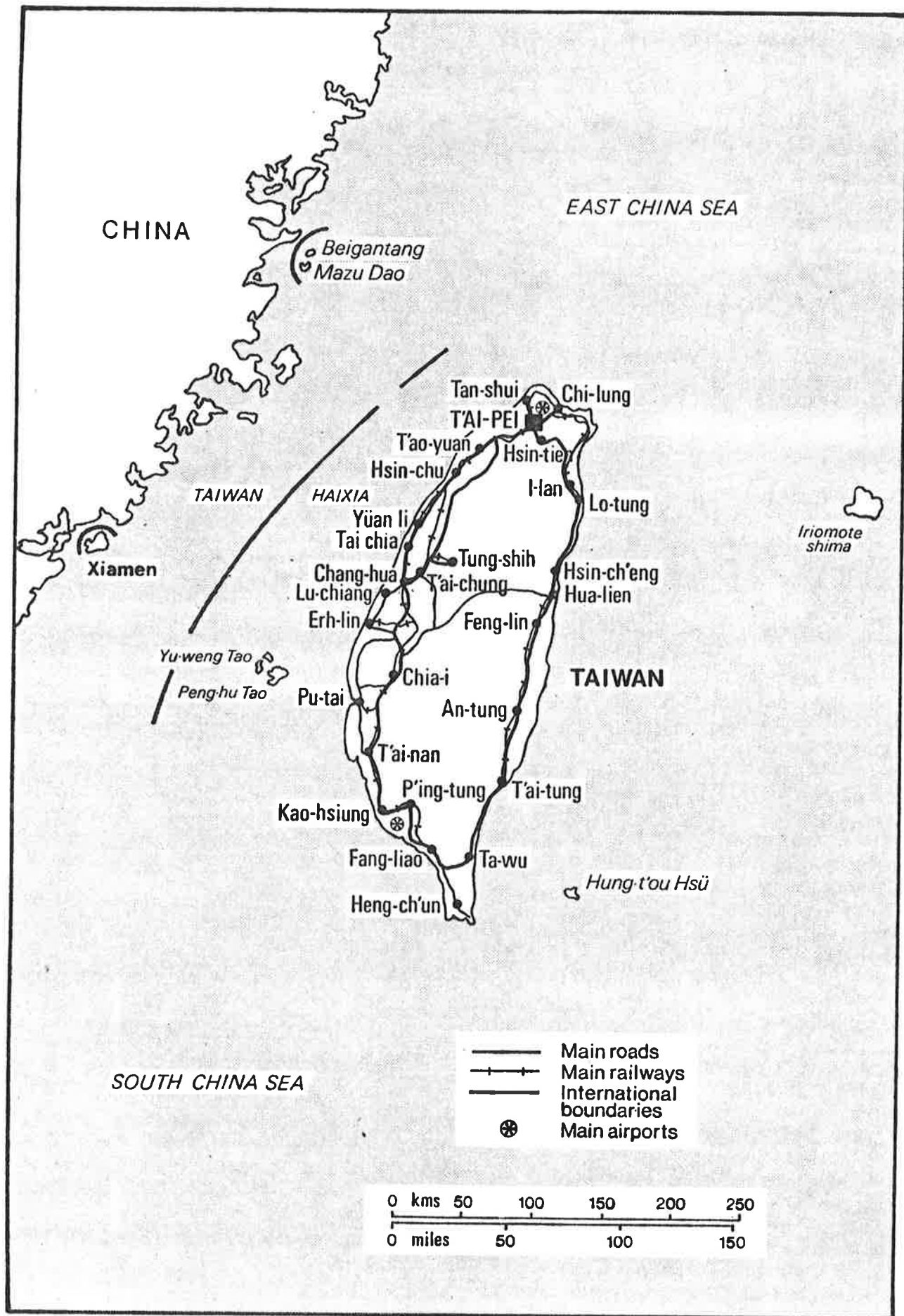
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Taiwan



I. INTRODUCTION

Forest products are an important component of Taiwan's international trade mix comprising the fifth largest commodity group exported in 1984 with a value of \$1.5 billion (EIU Annual Supplement, 1985), or 4.2% of the country's foreign exchange earnings (Asian Timber, Nov. 1985). This is an increase of over 500% since 1975. Nearly 65,000 people are employed across all wood-based sectors and their per capita productivity is around US \$2,500.

Not only has the value of wood products exports increased, but also the diversity of products exported. In 1975 plywood accounted for over half of Taiwan's wood exports but today plywood exports account for less than one-fifth of Taiwan's total products exports. New growth markets include wood interior housing components, builder's joinery, and rattan, bamboo, and other furniture.

Taiwan has little available domestic forest resources which require reliance upon imports of virtually all logs, sawnwood, fiberboard, particleboard, veneer as well as bamboo and rattan used in domestic production.

Taiwan's recent attempts to mitigate potential U.S. protectionist legislation, aimed at decreasing the 10 billion U.S. trade deficit, have included reductions in tariffs on processed wood products. This development, as well as new interest in the U.S. exemplified by a 1985 tour of western Washington and Alaska state forest lands by a delegation of Taiwanese forest products manufacturers, will help to create new export opportunities for U.S. forest products industries.

This paper will examine structural changes that have occurred in Taiwan's forest products sector over the past four decades and how these changes influence Taiwan's participation in world forest products trade.

II. BASIC COUNTRY DATA: TAIWAN

Land Area: 35,981 square km

Population: 19.01 mn (end of 1984)

Main Towns: Population in '000 (1983)

Taipei (capital)	2,388	Taichung	636
Kaohsiung	1,262	Tainan	623

Climate: Sub-tropical

Weather at Taipei (altitude 9 m): hottest month, July, 24-33°C (average daily minimum and maximum); coldest month, February, 12-18°C; average rainfall: driest month, November, 66 mm; wettest, August, 305 mm.

Languages: Mandarin, Taiwanese and other dialects of Chinese.

Measures: Metric system; some Chinese measures are also in use.

Currency: New Taiwan dollar = 100 cents. Exchange rate period average 1984: 1 = NT\$52.23 \$1=NT\$39.63

Geographic: Taiwan consists of 86 islands located approximately 100 miles east of mainland China, separated by the Straits of Taiwan (see Map, page 3). The largest island, Taiwan island, is 394 kilometers long and 142 kilometers wide. Over 60% of the island is mountainous limiting available living space for the population of over 19 million.

Demographic: Because so much of the country is uninhabitable, Taiwan has one of the highest population densities in the world, estimated at 528 persons/square kilometer in 1984.

Taiwan has two cities of over 1 million persons (Taipei and Kaosiung), a reflection of the concentration of the population on the western and northern edges of the island. The rate of growth of the population has been declining steadily from 3.7% in 1959 to 1.6% in 1983 (EIU 1985). Government efforts at encouraging migration to less populated areas on the eastern edge of the country have been met with resistance and are generally ineffective.

The population is almost entirely Chinese and includes approximately 2 million Mainland Chinese who came to the island in its early days of establishment in 1947-49.

Gross National Product: Taiwan's economy has experienced phenomenal growth over the past two decades with target levels consistently being exceeded. In the 1969-1972 economic plan, a 7% annual growth was projected with 11.6% being achieved. Over the period of 1980 to 1984 an average annual growth rate of 6.8% existed. The current 10-year economic plan (1980-89) projects an overall 10.3% annual growth rate (EIU 1985). Per capital GNP is one of the highest in the newly industrialized countries and reached \$3,067 in 1984 (U.S. Department of Commerce, ITA, Foreign Economic Trends and Their Implications on the U.S. Taiwan. FET 85-105, October 1985).

Currency: Taiwan established a multi-tiered exchange rate system in 1949 with differing rates for imports, exports and remittances of foreign company profits. In 1963 in an attempt to encourage exports, the government created a single exchange rate setting the New Taiwan Dollar which was pegged to the U.S. dollar at a fixed rate of NT\$40 to US\$1. This rate remained until 1973 when, in response to the devaluation of the U.S. dollar, the rate was adjusted to NT\$38 to US\$1. The New Taiwan dollar revalued in 1978 at NT\$36 to US\$1. In 1979 the currency was allowed to float in a narrow band managed float. Throughout the period to 1983 the New Taiwan dollar remained stable but in 1982 steadily depreciated to NT\$40 to US\$1. At the end of April 1985 the rate was NT\$38.87 after a 3.5% appreciation in 1984 (EIU, 1985).

Overall Economic Strategy: Although Taiwan's 1985 real GNP growth of 6% is high by world standards, it is much lower than the double digit rates experienced over the period of the late 60s to early 70s and an 8.7% average of the past 3 decades. The recent downward adjustment in government GNP estimates indicates a continuing slowing trend in growth in the economy and has led to government re-evaluation of economic policies. The recent 10-year economic plan (1980-1989) includes shifts in economic policy aimed at mitigating Taiwan's continuing, but not yet critical, loss of comparative advantage in the international community. As Taiwan's economic growth continues, labor costs are rising consistently.

For example, in 1984 wages rose by 16% against an increase of productivity of only 3.3%. Real wages are increasing an average of 14.2% a year in industry in the 1973-1984 period (Barclays ABECOR Country Report, August 1985). These increased labor costs have been identified as one of the major factors in stalling the pace of economic growth. However, wage competitors such as Sri Lanka, Indonesia, and the People's Republic of China are increasing their production of goods that compete with Taiwan's primary export earners. The main products in this category are textiles, consumer electronics, and footwear.

Present economic policy places an emphasis on shifting from a labor intensive manufacturing base to an energy efficient and capital and technologically

intensive industrial structure. For example, the 10-year plan seeks increased public and private spending for research and development. Research and development constituted only 0.7% of GNP in 1973 while the United States and Japan committed 2.4 and 2.1 percent of GNP respectively in that year (U.S. Department of Commerce ITA, Overseas Business Reports. Marketing in Taiwan, Nov. 1985). By 1989 Taiwan hopes to have 2.0% of GNP allocated to research and development with most of this coming from the private sector. An additional component of the current strategy is to increase the pool of skilled labor in both management and technological areas.

III. IMPORTS/EXPORTS

Taiwan is one of the most important countries in the world in terms of international trade of goods and services. In 1984 the value of total foreign trade exceeded \$52 billion with an annual growth rate exceeding 15% over the period from 1985-82 (EIU 1985 Annual). Presently, Taiwan ranks as the world's 15th largest trading nation and 11th largest exporter in value terms.

Export growth hovers at around 20% per year and in value terms has tripled since 1978 to over \$30 billion in 1984. Import growth in 1984 was only 8.3%, typical of preceding years. The great difference in growth rates of exports and imports created a net surplus of over \$8.5 billion in 1984 up from only 78 million in 1980 (see Table 1). Only once since 1964 (during 1973-75 oil shock) has Taiwan experienced a trade deficit ('85 Foreign Trade Develop of Taiwan, Board of Foreign Trade, Ministry of Economic Affairs).

Exports of goods and services accounted for 59% of Taiwan's GNP in 1984 underscoring the importance of trade to the country's domestic economy (EIU, 1985 annual).

The composition of Taiwan's exports and imports has shifted over the past three decades. In the 1950's the country was a consumer of finished products and an exporter of agricultural commodities such as rice, sugar and wood products. This trade pattern is typical of 'less developed countries' or LDCs. As technological advances are made and the general economic system of an LDC experiences a period of development, the pattern of trade typically shifts to an export mix of manufactured goods and an import mix of raw materials as inputs of production. This has been the case in Taiwan. A successful program started in the 1960s aimed at promoting important substitution industries has created a present situation where manufactured goods make up over 43% of the origin of GDP. Manufacturers of electrical machinery and textiles alone comprised 42% of the value of Taiwan's exports in 1984 (see Tables 2 and 3, origins of Taiwan's GDP and principal exports in 1984).

On the import side, raw material products make up the bulk of the country's imports reflecting both the shift to import substitution of consumer goods as well as the problem of having limited natural resources particularly energy and mineral resources. As would be expected in a manufacturing oriented nation with nonexistent energy reserves, crude oil is the country's number one import. In 1984 crude oil comprised 17% of Taiwan's imports. An interesting point worth mentioning is the fact that even though electrical machinery is Taiwan's number one export category, it also is the number two import reflecting a continuing requirement of technology transfer. Table 4 shows that Taiwan's principal imports in 1984 were also inputs to the country's manufac-

Table 1. Trend of Foreign Trade
(US\$ mn; customs clearance basis)

	1980	1981	1982	1983	1984
Exports cif	19,811	22,611	22,204	25,123	30,456
Imports fob	19,733	21,200	18,888	20,287	21,959
Balance	78	1,411	3,316	4,836	8,497
Terms of trade (1981=100)	164.1	100.0	91.2	90.9	89.3
Volume of exports (1981=100)	91.1	100.0	103.0	122.5	141.6
Volume of imports (1981=100)	101.0	100.0	85.2	96.1	97.56

Source: Monthly Statistics of the Republic of China
Reproduced from: Quarterly Economic Review of Taiwan Annual Supplement, 1985

Table 2:

Origins of GDP 1984	% of total	Principal Exports 1984	US\$ mn
Agriculture, forestry and fishing	6.4	Electrical machinery	6,570
Mining	0.7	Textile products	6,079
Manufacturing	43.1	Plastic products	2,411
Utilities	3.8	Metal products	1,738
Construction	4.6	Wood and paper products	1,478
Transport, storage and communications	6.4	TOTAL INCL. OTHERS	30,422
Wholesale and retails trade	14.4		
Banking, insurance, real estate	3.8		
TOTAL, INCL. OTHERS	100.0		

Table 3:

Reproduced from: Economic Intelligence Unit, Taiwan Quarterly Economic Review, No. 4, 1985

turing sector. Table 5 summarizes the main commodities traded in Taiwan and will be referred to later in the discussion of wood products trade.

Export Destinations

Nearly half of all Taiwan exports go to the United States, a reflection of the vast markets and demand for consumer goods in that country (Table 6). Taiwan is the United States' fifth largest trading partner and produces the US's third largest trade deficit. This trade surplus for Taiwan amounted to \$9.8 billion in 1984 (Ministry of Economic Affairs, ROC, Figure 1).

Table 4. PRINCIPAL IMPORTS 1984

	US\$ mn
Crude petroleum	3,773
Electrical machinery	3,155
Machinery	2,171
Basic metals	2,041
Chemicals	1,924
Chemical products	1,284
TOTAL INCL. OTHERS	21,991

Source: Quarterly Economic Review of Taiwan, No. 4, 1985

Table 5. MAIN COMMODITIES TRADED

Exports fob	1982	1983	Imports cif	1982	1983
Elec. machinery	152.18	194.25	Crude oil	156.84	164.23
Clothing	126.13	136.40	Electrical machinery	78.12	94.72
Textile products	60.20	63.71	Non-electrical		
Transport equipment	42.49	40.94	machinery	76.61	75.30
Machinery	32.88	38.67	Base metals	64.37	71.86
Plastic footwear	30.12	34.00	Chemicals	54.73	71.20
Base metals	25.84	27.83	Transport Equipment	40.22	40.15
Plywood	12.99	14.50	Maize	14.57	19.65
Canned asparagus	3.52	2.48	Logs	16.75	17.12
Canned mushrooms	2.51	2.48	Coal	16.13	15.87
Sugar	3.81	1.60	Soya beans	13.23	14.85
			Raw cotton	14.97	13.17

Source: Industry of Free China

Reproduced from: Quarterly Economic Review of Taiwan, Annual Supplement, 1985)

As a result of widening trade deficits, a climate of protectionism is developing. This has adversely affected Taiwan exports in two ways. First, U.S. import demand declined through the first three quarters of 1985 resulting in a 2% decline in exports from Taiwan to the U.S. It is hoped that Mainland China (through Hong Kong, Japan and Singapore), Japan, and Hong Kong will be able to absorb this difference. Secondly, protectionist legislation passed by or pending before the U.S. Congress has forced Taiwan and other net surplus trading partners to re-evaluate potential opportunities in their domestic markets for U.S. manufacturers in an effort to equilibrate the trade situation.

Import Origins

As seen in Table 6, most of Taiwan's imports originate in Japan and the United States. As previously stated, a majority of these imports from both these countries are machinery and chemicals. It is noteworthy that cereals and

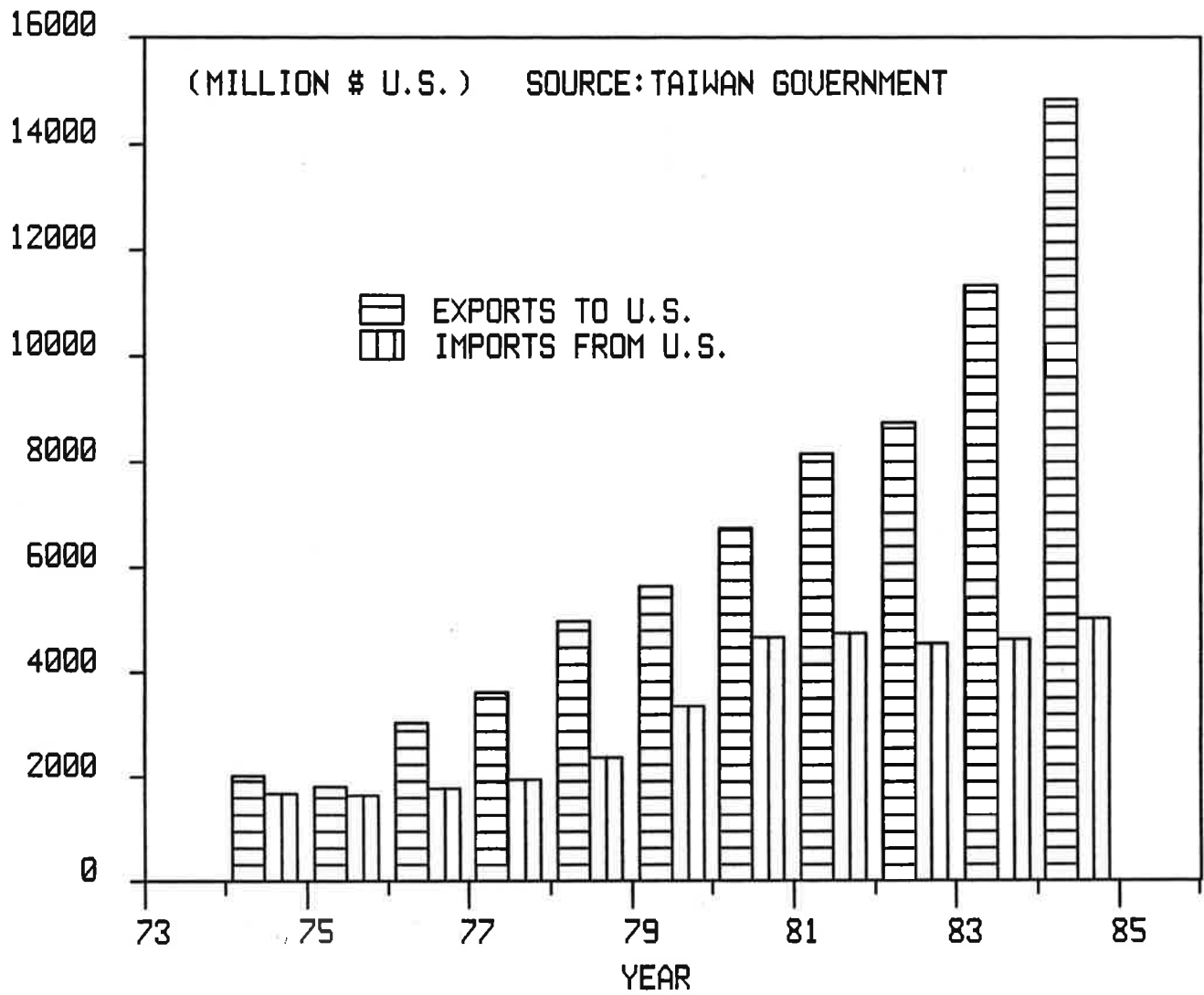


Figure 1. Taiwan Trade with United States 1974-1984

Table 6. MAIN TRADING PARTNERS (% of total)

Exports	1983	1984	Imports	1983	1984
USA	45.1	48.8	Japan	27.5	29.3
Japan	9.9	10.5	USA	22.9	22.9
Hong Kong	6.5	6.9	Saudi Arabia	9.5	9.0
West Germany	3.4	2.8	Kuwait	5.6	5.2
Saudi Arabia	3.0	2.4	West Germany	3.4	3.5
Canada	2.9	3.0	Australia	3.4	3.5
Australia	2.5	2.7			
UK	2.5	2.3			

Source: Industry of Free China

Reproduced from: Quarterly Economic Review of Taiwan, No. 4, 1985

associated grain preparations comprised nearly 11% of all Taiwan imports from the US from January to July 1985 (EIU, No. 4, 1985).

As protectionist legislation in the U.S. becomes a reality, absolute values of U.S. exports to Taiwan can be expected to increase.

IV. TAIWAN'S FOREST RESOURCES

Of the total area of Taiwan, 52 percent, or 1.86 million hectares is classified as forest land. However, the availability of forest land for commercial production is severely limited because much of the island of Taiwan is mountainous and inaccessible.

Of the over 800 tree species found in Taiwan, the most important commercial species are cedar, hemlock, oak, machilus, spruce, and China fir, which account for 14%, 13%, 14%, 12%, 6%, 2%, and 1.5% of the total growing stock inventory, respectively (Jen, Timber Demand, Supply and Price Fluctuations in Taiwan, 1984). Forest types in Taiwan change with altitude. Under 500 meters, tropical forests and bamboos dominate and many kinds of fast-growing trees are planted in small areas by private owners. Between 500 and 2,000 meters, hardwood-conifer mixed stands are found in addition to subtropical and temperate tree species. Above 2,000 meters, there are alpine types of conifer forests dominated by spruce, hemlock, cedar, pine and fir (Kwang-Yao Tai, 1985).

According to the 1972-1977 forest resources survey, forests cover more than half of the total land area of Taiwan. Of the total 1,864,600 hectares of forest land, hardwood species occupy 62% and conifer species 22%. The remainder is bamboo and nonproductive forest land. The total forest land area contains 330,000,000 cubic meters of wood with 226,000,000 cubic meters of sawnlog timber. Hardwoods constitute 58% and conifers 42% of the total volume. The average growing stock is 183 cubic meters and the average annual growth 6 cubic meters per hectare (Kwang-Yao Tai, 1985).

The forest resources are summarized in Tables 7 to 10.

Table 12 shows production level by species in 1983.

Table 7. Forest Land Area by Forest Type Group

Forest Type Group	Area (ha)	Percentage (%)
Spruce-fir	35,500	2
Hemlock	71,100	4
Cypress (cedar)	74,500	4
Pines	68,500	4
Other conifers	6,600	1
Conifer plantation	158,700	8
Conifer-hardwood	156,400	8
Hardwoods	751,900	40
Hardwood plantation	278,600	15
Hardwood-bamboo plantation	51,600	3
Bamboo plantation	133,000	7
Non-productive forest land	78,200	4
TOTAL	1,864,000	100

Harvest Patterns

Harvest levels for all species have been declining over the past two decades. The major reasons cited are an effort to control erosion, a serious problem especially in mountainous terrain, high domestic production costs, competition from imported logs and a growing concern for conserving residual timber areas for multiple use activities, particularly those which are recreation oriented.

In recent years for the purpose of conserving the forest resources, the government has restricted the annual cutting to 1,000,000 cubic meters per year and raised the annual planting rate to 30,000 hectares (Kwang-Yao Tai, 1985). Table 11 shows the changes that have occurred over the past 4 decades in harvest patterns. Over this period labor costs have soared while import duties for raw logs typically remain between 0 and 2.5% (World Wood Review, Nov. 1984).

This situation points to a continued and increasing reliance in the future on imported raw materials.

Reforestation efforts have progressed under government sponsored programs averaging about 30,000 hectares per year from 1973 to 1980. Since that time, reforestation activities have declined dramatically to only 4,477 hectares in 1983 (see Table 13). Table 14 shows reforestation by government agency in 1983, by district.

V. SUPPLY/DEMAND OF FOREST PRODUCTS

The total demand for timber products in 1983 on a volume basis was 7.0 million cubic meters. The end uses of demand were estimated to be: plywood 35%, pulp 21%, construction 17%, furniture 14% and others 13% over the period of 1973-83, demand for forest products as an aggregate increased 40%. Tables 15 and 16 summarize trends of Taiwan's imports and exports of logs, lumber and pulpwood since 1971.

Table 8. Total Net Volume by Tree Class and Species Group.

Species group	Sound trees	Other trees	Total
(in 1,000 cubic meters)			
Cedar (cypress)	42,910	2,313	45,214
Hemlock	42,637	111	42,748
Spruce-fir	18,949	95	19,004
Pine	19,639	23	19,662
Cryptomeria	6,006	118	6,124
China fir	4,529	56	4,585
Taiwania	397	7	404
Other conifers	1,451	57	1,508
Subtotal softwood	136,509	2,780	139,289
Quercus spp.	45,451	259	45,710
Zelkova	1,401	21	1,422
Camphor	1,882	1	1,883
Michelia spp.	894	--	894
Machilus spp.	39,433	107	39,540
Other hardwoods	100,851	439	101,290
Subtotal hardwoods	189,912	827	190,739
Total	326,421	3,607	330,028

Table 9. Growing Stock per Hectare by Forest Type.

Forest type	No. of trees/ha	Basal area (m ² /ha)	Volume (m ³ /tree)	Volume (m ³ /tree)	Annual growth (m ³ /tree)
Spruce-fir	1,226	60.4	0.409	502	6.1
Hemlock	1,477	67.6	0.365	538	5.5
Cypress	2,528	69.2	0.218	551	8.0
Pine	2,751	31.0	0.072	198	6.9
Other conifer	2,841	49.2	0.126	358	5.6
Conifer plantation	2,954	16.2	0.025	73	4.8
Conifer-hardwood	3,338	52.0	0.105	352	10.2
Hardwood	3,058	31.2	0.058	179	8.0
Hardwood plantation	3,103	10.4	0.011	34	2.7
Hardwood-bamboo	2,537	11.2	0.019	49	2.7
Average	2,786	29.35	0.066	183	6.2

Table 10. Growth, Mortality: Conifers and Hardwoods

Sound trees	Conifer	Hardwood	Total
Sound trees gross volume (m ³)	136,509,000	189,912,000	326,421,000
Gross annual growth (m ³ /yr)	2,079,000	8,972,400	11,051,400
Annual mortality (m ³ /yr)	2,470,000	180,000	2,650,000
Net annual growth (m ³ /yr)	391,000	8,792,400	8,401,400
Net annual growth (%)	0.29%	4.63%	2.57%

Table 11. Taiwan Timber Harvest 1942-1983

Year	Volume (M ³)
1942	1,784,184
1950	517,743
1960	1,221,492
1970	1,554,589
1980	775,058
1981	718,586
1982	677,260
1983	610,000

Source: Taiwan Government Statistics Reproduced from World Wood Review, November 1984.

Table 12. Timber Production by Species (cubic meters)

Species	1981	1982	1983
Conifers, Total	331,677.20	297,734.50	383,450.
<u>1st Class Sub-total</u>	125,022.11	124,272.50	164,654.
Chama ecyparis Taiwanensis Ma.	47,178.83	53,865.82	69,812.
Chama ecyparis Formosensis Matsum	74,178.83	66,617.21	92,448.
Cunninghamia Konshii Hay	914.13	2,526.49	2,243.
Libocedrus Formosana Florin	2,038.05	1,026.06	123.
Taxus Chinensis Rehder	42.83	236.92	55.
<u>2nd Class Sub-total</u>	195,247.48	173,462.00	218,795.
Taiwania Cyptomeriodes Hay	11,497.61	7,260.70	9,105.
Tsuga Chinensis Prtzh	39,645.20	40,079.06	54,107.
Abies Kawamlii Ito	108.66	97.11	4,121.
Picea Morrissonicola Hay	18,174.86	19,046.43	19,301.
Pseudotsuga Wilsoniana Hay	6,380.37	2,431.47	1,191.
Cryptomeria Japonica D. Don	36,007.99	30,563.14	43,248.

(Table 12 cont.)

Species	1981	1982	1983
Cunninghamia Konishii Hay	----	--	
Cunninghamia Lanceolata Hook	68,755.47	46,683.29	55,426.
Pinus	8,790.75	10,532.63	13,826.
Pinus Taiwanesis Hay	583.77	66.95	116.
Pinus Armandi Franchet	----	--	
Pinus Morrsonicola Hay	4.38	4.96	246.
Pinus Lucbunesis Mayr	2,091.58	3,114.54	4,471.
Pinus Massoniana Lamb	17.05	107.73	--
Pinus Elliottii Engelm	9.82	4.70	--
Other Conifers	14,677.57	13,469.29	13,631.
Hardwoods Total	197,928.58	197,201.23	232,619.69
Michelia Formosana Maasm	2,236.11	2,241.89	2,156.82
Sassafras Randalensis Rehd	385.96	684.98	312.99
Diopsypyros Utilis Hemsl	--	--	--
Listacia Chinesis Bunge	1.86	--	0.48
Dalbergia Sisso Roxb	3.41	1.13	2.25
Pterocarpus Indicus Willd	133.99	0.79	--
Swietenia Mahagoni Jacq	65.90	74.15	65.16
Tectona Grandis Linn	2,117.79	1,535.32	1,034.54
Cinnamomum Micranthum Hay	1,179.47	1,869.63	2,702.84
Cinnamomum Camphora Sieber	1,057.02	896.54	2,184.01
Sassafras Rngdalense Rehd	90.89	92.40	41.35
Achilus Kusanoi Hay	36,301.13	40,010.41	37,885.89
Oak	12,836.25	14,939.33	16,503.52
Oak	--	--	--
Oak	33,384.27	29,986.47	48,049.89
Cassia Siamea Lam	105.50	146.85	46.47
Acacia Confusa Merrill	15,121.05	11,380.35	11,038.35
Paula Wnia Fortunei Hemsl	5,096.19	5,133.33	7,594.23
Aleurites Fordii Hemsl	3,432.01	2,188.24	3,341.77
Schima Ruperba Champ	6,772.28	8,862.93	9,545.74
Alnus Formosana Makino	1,205.32	531.51	2,141.13
Lipuidambr Formosana Hane	44.12	86.89	19.91
Scheffera Octophylla Harsm	733.34	598.11	1,072.71
Trema Orzentalis Blume	38.59	102.44	61.30
Belia Zaedarch Linn	--	14.33	3.90
Eucalyptus	14.48	70.70	--
Casuaria Spp.	2.52	--	--
Other Hardwoods	75,569.13	75,752.45	86,814.44

(Table 13 cont.)

	Cryptomeria Japonica D. Don.	Taiwania Cryptomeria eriodes Hay	Pinus Luchuensis Mayr	Pinus Taiwanensis Hay	Pinus Elliotii Engelm	Cinnamomum Camphora Sieber	Liquidambar formosana Hance	Aleurites Fordii Hemsl	Salvador Type Leucaena leucocephala	Mixed plan- tation of		
										Other Hardwoods species	Conifer and Hardwood species	Bamboo
(1973)	1,555.66	101.00	552.88	1,715.00	303.	--	--	--	--	6,134.88	3,109.34	1,798.58
(1974)	1,607.01	238.50	645.48	794.20	265.	--	--	--	--	6,265.59	3,364.26	1,914.86
(1975)	1,179.83	163.82	1,180.18	250.14	175.	--	--	--	--	7,683.51	3,113.61	1,880.64
(1976)	1,260.37	31.00	658.95	633.86	183.	--	--	--	--	7,059.47	4,089.67	793.38
(1977)	1,475.38	191.17	739.00	512.38	191.	--	--	--	--	6,416.32	3,356.99	545.16
(1978)	2,086.17	58.57	1,056.72	476.54	283.	--	--	--	--	7,490.97	4,486.81	935.64
(1979)	1,572.22	148.66	474.00	--	128.	--	--	--	--	8,322.66	5,454.00	1,315.35
(1980)	1,635.80	106.59	221.10	190.87	276.	--	--	--	--	10,329.84	2,619.75	1,467.48
(1981)	827.78	102.21	436.10	5.00	314.	--	--	--	--	9,628.97	2,350.06	1,378.18
(1982)	630.93	345.66	345.60	309.09	181.	802.63	1,915.03	1,034.63	1,719.82	2,362.04	1,216.82	606.45
(1983)	119.99	93.51	180.56	--	400.	238.56	849.20	75.23	87.43	468.71		

Table 14. Reforestation by Agency--1983

	Grand Total		Commercial Forest		Flood Control Forest	
	By District	Area (ha)	Seedling	Area (ha)	Seedling	Area (ha)
Grand Total		4,555.28	9,148,326	784.87	1,424,299	100.00
Total		1,374.94	1,958,639	257.65	328,157	100.00
Wenshan F.D.O.		4.18	10,450	--	--	--
Chutung F.D.O.		214.65	96,925	108.10	89,100	--
Tachia F.D.O.		112.75	128,750	--	--	100.00
Puli F.D.O.		234.67	319,823	51.63	118,623	--
Luanta F.D.O.		119.50	298,750	--	--	--
Yushan F.D.O.		96.56	191,800	--	--	--
Nanhung F.D.O.		311.71	312,000	--	--	--
Hengchum F.D.O.		92.64	407,230	--	--	--
Kuanshan F.D.O.		64.12	64,200	64.12	64,200	--
Yuli F.D.O.		58.63	41,806	--	--	--
Mukua F.D.O.		14.00	9,300	--	--	--
Lingy ang F.D.O.		51.53	77,599	33.80	56,234	--
Tahsuehshan F.D.O.		--	--	--	--	--
Total		585.69	1,198,546	492.22	1,013,596	--
Forest Development O.		31.43	50,250	--	--	--
NTU Experiment F.O.		202.74	613,120	202.74	613,120	--
NCU Experiment F.O.		194.58	434,950	135.54	302,050	--
Forestry Research Inst.		153.94	98,426	153.94	98,426	--
Chia-nan Agriculture and Water Development C.		3.00	1,800	--	--	--
Chihu Sugar Mill		--	--	--	--	--
Total		2,594.65	5,991,141	35.00	82,546	--

(Table 14 cont.)

By District	Grand Total		Commercial Forest		Flood Control Forest	
	Area (ha)	Seedling	Area (ha)	Seedling	Area (ha)	Seedling
Taipei City	78.00	185,016	35.00	82,546	--	--
Kaohsiung City	--	--	--	--	--	--
Taiwan Province	2,516.65	5,806,125	--	--	--	--
Taipei H.G.	360.00	870,000	--	--	--	--
Han H.G.	239.36	610,900	--	--	--	--
Taoyuan H.G.	100.00	230,000	--	--	--	--
Hsinchu H.G.	327.50	796,856	--	--	--	--
Miaoli H.G.	540.40	940,600	--	--	--	--
Taichung H.G.	144.80	426,300	--	--	--	--
Changhua H.G.	--	--	--	--	--	--
Nantou H.G.	310.00	577,660	--	--	--	--
Yunlin H.G.	3.00	15,000	--	--	--	--
Chiayi H.G.	89.31	223,025	--	--	--	--
Tainan H.G.	26.00	80,000	--	--	--	--
Kaohsiung H.G.	--	--	--	--	--	--
Pingtung H.G.	10.00	4,650	--	--	--	--
Taitung H.G.	242.28	457,134	--	--	--	--
Hualien H.G.	109.00	504,000	--	--	--	--
Penghu H.G.	5.00	50,000	--	--	--	--
Keelung M.G.	10.00	20,000	--	--	--	--
Hsinchu M.G.	--	--	--	--	--	--
Taichung M.G.	--	--	--	--	--	--
Chiayi M.G.	--	--	--	--	--	--
Tainan M.G.	--	--	--	--	--	--

(Table 14 cont.)

By District	Protection Forest		Coastal Wind Break Forest		Farm Land Break Forest		Public and Private Forest	
	Area (ha)	Seedling	Area(ha)	Seedling	Area(ha)	Seedling	Area (ha)	Seedling
Grand Total	194.97	338,778	55.00	307,000	4.50	159,000	2,378.85	5,239,267
Total	0.20	500	--	--	--	--	--	--
Wenshan F.D.O.	--	--	--	--	--	--	--	--
Chutung F.D.O.	--	--	--	--	--	--	--	--
Tachia F.D.O.	--	--	--	--	--	--	--	--
Puli F.D.O.	--	--	--	--	--	--	--	--
Luanata F.D.O.	--	--	--	--	--	--	--	--
Yushan F.D.O.	--	--	--	--	--	--	--	--
Nanhung F.D.O.	--	--	--	--	--	--	--	--
Hengchum F.D.O.	0.20	500	--	--	--	--	--	--
Kuanshan F.D.O.	--	--	--	--	--	--	--	--
Yuli F.D.O.	--	--	--	--	--	--	--	--
Mukua F.D.O.	--	--	--	--	--	--	--	--
Lingyang F.D.O.	--	--	--	--	--	--	--	--
Tahsuehshan F.D.O.	--	--	--	--	--	--	--	--
Total	93.47	184,950	--	--	--	--	--	--
Forest Development O.	31.43	50,250	--	--	--	--	--	--
NTU Experiment F.O.	--	--	--	--	--	--	--	--
NCU Experiment F.O.	59.04	132,900	--	--	--	--	--	--
Forestry Research Institute	--	--	--	--	--	--	--	--
Chia-nan Agriculture and Water Development C.	3.00	1,800	--	--	--	--	--	--
Chihu Sugar Mill	--	--	--	--	--	--	--	--
Total	101.30	153,328	55.00	307,000	4.50	159,000	237.885	5,239,267

(Table 14 cont.)

By District	Protection Forest		Coastal Wind Break Forest		Farm Land Break Forest		Public and Private Forest	
	Area (ha)	Seedling	Area (ha)	Seedling	Area (ha)	Seedling	Area (ha)	Seedling
Taipei City	4.00	--	9,962	--	--	--	--	39.00 92,508
Kaohsiung City	--	--	--	--	--	--	--	--
Taiwan Province	97.30	55.00	143,366	55.00	307,000	4.50	159,000	2,339.85 5,146,759
Taipei H.G.	--	--	--	--	--	--	--	340.00 820,000
Han H.G.	--	5.00	--	5.00	25,000	--	--	234.36 585,900
Taoyuan H.G.	--	--	--	--	--	--	--	100.00 230,000
Hsinchu H.G.	--	--	20,856	--	--	--	--	327.50 776,000
Miaoli H.G.	--	--	--	--	--	--	--	540.40 940,600
Taichung H.G.	21.30	5.00	21,300	5.00	25,000	3.50	140,000	115.00 240,000
Changhua H.G.	--	--	--	--	--	--	--	--
Nantou H.G.	66.00	--	33,160	--	--	--	--	244.00 544,500
Yunlin H.G.	--	3.00	--	3.00	15,000	--	--	--
Chiayi H.G.	--	1.00	14,000	1.00	--	--	--	88.31 209,025
Tainan H.G.	--	6.00	16,000	6.00	24,000	--	--	20.00 40,000
Kaohsiung H.G.	--	--	--	--	--	--	--	--
Pingtung H.G.	--	--	4,650	--	--	--	--	--
Taitung H.G.	10.00	22.00	33,400	22.00	120,000	--	--	220.28 303,734
Hualien H.G.	--	8.00	--	8.00	48,000	1.00	19,000	100.00 437,000
Penghu H.G.	--	5.00	--	5.00	50,000	--	--	--
Keelung M.G.	--	--	--	--	--	--	--	10.00 20,000
Hsinchu M.G.	--	--	--	--	--	--	--	--
Taichung M.G.	--	--	--	--	--	--	--	--
Chiayi M.G.	--	--	--	--	--	--	--	--
Tainan M.G.	--	--	--	--	--	--	--	--

Note: 1. The forest of town and city is included in protection forest.

2. The forest of coast at Taoyuan is included in the data of Taoyuan Pref.

V. SUPPLY/DEMAND OF FOREST PRODUCTS

The total demand for timber products in 1983 on a volume basis was 7.0 million cubic meters. The end uses of demand were estimated to be: plywood 35%, pulp 21%, construction 17%, furniture 14% and others 13% over the period of 1973-83, demand for forest products as an aggregate increased 40%. Tables 15 and 16 summarize trends of Taiwan's imports and exports of logs, lumber and pulpwood since 1971.

1. Logs--Demand

The demand for sawnlogs and veneer logs has increased rapidly over the past three decades concomitantly with a pattern of accelerated economic growth. Demand, which was only 540,000 cubic meters in 1952, exceeded 2 million cubic meters in 1968, reached its peak in 1978 at 7.3 million cubic meters, and declined to 5.3 million cubic meters in 1983 (Jen, 1985).

Of total demand, 90% was supplied by imports in 1978 and 88% in 1983 (Jen, 1985). Most of these imports originated in Indonesia, Malaysia, the Philippines, and Papua New Guinea (See Table 17).

During the period of 1973 to 1983 veneer log demand increased by 2.5% attributed to the decline in the plywood industry. This decline was due to increased competition by Indonesia and South Korea in plywood export markets.

Supply

In 1969, for the first time, imported timber which was 1.12 million cubic meters exceeded the domestic timber supply of 1.05 million cubic meters. Since that time the local supply has continued to decline and was only 0.61 million cubic meters in 1983.

Primary reasons cited for such a dramatic shift to foreign supply sources are: the depletion of domestic forest resources, inaccessibility and therefore high price of harvesting of residue forest stands, and a government policy that encourages erosion control measures as well as multiple use activities in the nation's forests. Figure 2 shows the decline in log production over the past decade.

The use of imported logs which are used primarily for producing plywood has increased from 1.0 million cubic meters in 1968 to 4.4 million cubic meters in 1984. In 1984 the primary sources of Taiwan's log supply was Malaysia 72.9%, Indonesia 12%, and the Philippines 5% (Asian Timber, 1985) (see Table 17). These countries' supply is composed almost exclusively of hardwood species. Only \$US2.2 million worth of softwood logs or cants were imported into Taiwan in 1984 of which the United States held a 56% market share. The low percentage of softwood logs in the import mix is indicative of Taiwan's emphasis in secondary processing and wood products production.

2. Lumber

Presently, there exists about 2,000 sawmills in Taiwan which produced .56 million cubic meters of lumber in 1984 (FRI). Of the total, conifers comprised 61% and non-conifers 39%. As domestic log resources are depleted and subsequent harvest levels decreased, domestic supply of saw timber has also been declining.

Table 15. Imports of Logs, Lumber and Pulpwood.

Year	Logs		Lumber and Board		Pulp log, chip and wood pulp	
	m ³	US\$1,000	m ³	US\$1,000	M.T.	US\$1,000
1971	2,205,287	69,145	23,047	1,003	--	--
1972	3,581,145	106,304	8,649	1,380	95,368	20,002
1973	3,860,394	185,451	8,751	1,896	91,375	23,438
1974	3,533,609	222,710	31,987	6,678	154,731	29,541
1975	3,645,159	142,268	22,568	5,669	133,714	18,254
1976	3,944,835	108,266	31,505	7,938	292,654	24,073
1977	5,465,650	312,227	30,770	10,361	325,408	36,394
1978	6,643,000	390,872	51,831	27,892	359,133	45,592
1979	6,291,005	600,407	123,748	45,284	538,930	97,504
1980	5,218,520	574,563	168,835	52,417	425,635	85,579
1981	4,948,817	509,122	367,228	64,621	854,507	103,333
1982	4,010,238	425,881	360,113	72,481	579,365	86,161
1983	4,697,154	410,160	512,053	111,096	910,951	133,595
1984	4,099,890	390,774	598,016	161,325	823,737	27,265

Table 16. Exports of Logs, Lumber and Pulpwood

Year	Logs		Lumber and Board		Pulp log, chip and wood pulp	
	m ³	US\$1,000	m ³	US\$1,000	M.T.	US\$1,000
1971	51,943	8,112	87,300	16,964	431,385	95,261
1972	46,154	13,928	136,822	26,321	616,594	136,599
1973	32,750	15,486	102,665	25,031	617,015	226,857
1974	7,932	5,050	44,825	22,450	444,685	172,857
1975	15,841	9,042	61,006	33,043	421,933	131,753
1976	13,983	8,433	71,129	41,893	474,520	190,185
1977	10,912	6,863	52,642	32,469	517,148	236,388
1978	15,241	11,252	71,525	51,058	673,347	333,793
1979	16,176	14,645	95,091	81,614	590,969	420,534
1980	12,524	10,077	73,617	51,637	465,080	371,912
1981	9,186	8,483	46,483	39,686	510,617	398,478
1982	12,652	6,457	42,612	34,969	441,313	334,228
1983	47,307	9,688	43,821	33,946	460,914	361,818
1984	80,288	11,831	46,001	33,926	321,949	280,087

Reproduced from Kwang-Yao Tai, 1985

Table 17. Log Import by Region in 1984.

Country and Area	m ³	%	Amount (US\$)	%
Indonesia	532,802	12.1	50,900,461	12.5
Malaysia	3,214,870	70.9	267,896,791	65.9
Philippines	234,593	5.3	21,265,609	5.2
Japan	8,015	0.2	1,356,479	0.3
Burma	41,085	0.9	16,440,304	4.1
Thailand	5,039	0.1	2,417,891	0.6
New Guinea	62,644	1.4	5,521,670	1.4
Others	310,447	7.1	40,542,329	10.0
Total	4,409,495	100.0	406,341,534	100.0

Table 18. Lumber Production, Exports, Imports

Year	Production	Exports		Imports	
	(m ³)	m ³	US\$	m ³	US\$
1960	357,958	20,344	977,517	1,254	48,233
1970	826,473	116,660	22,236,000	2,907	177,000
1975	1,007,497	61,006	33,043,000	22,568	5,669,000
1980	1,024,314	53,497	57,360,000	137,776	42,662,000
1981	1,238,166	46,483	39,686,000	367,228	64,621,000
1982	894,480	42,612	34,969,000	360,113	62,481,000
1983	776,720	43,821	33,946,000	512,053	111,096,000
1984	638,829	42,116	32,469,000	628,937	137,901,000

As seen in Figure 3, this declining trend has prevailed consistently over the past decade. One important consequence of this is the country's requirement of dramatically increasing imports of lumber, especially to supply its booming furniture manufacturing industries. Table 18 shows production, exports, imports of sawnwood in Taiwan.

Figure 4 depicts the meteoric rise in lumber imports over the past 5 years. All indications point to this trend continuing which can only lead to increased export opportunities for the United States. This trend has been substantiated by recent U.S. exports of substantial volumes of hardwood lumber to Taiwan.

The shift in activity in the sawnwood industry sector is indicative of a general evolution toward higher value-added products. This is demonstrated by the transition from an emphasis on production of sawnwood to plywood to, presently, furniture and other finished products.

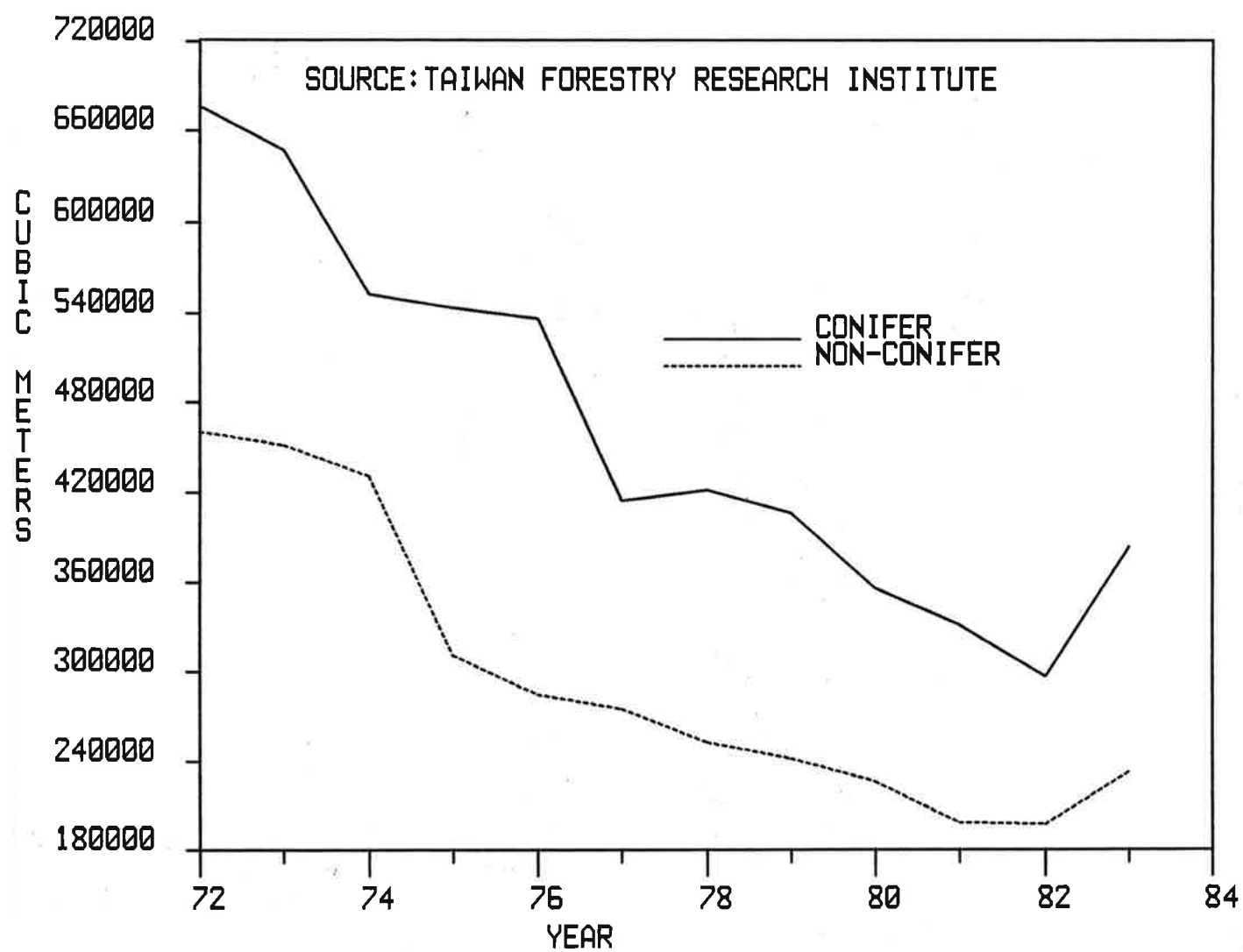
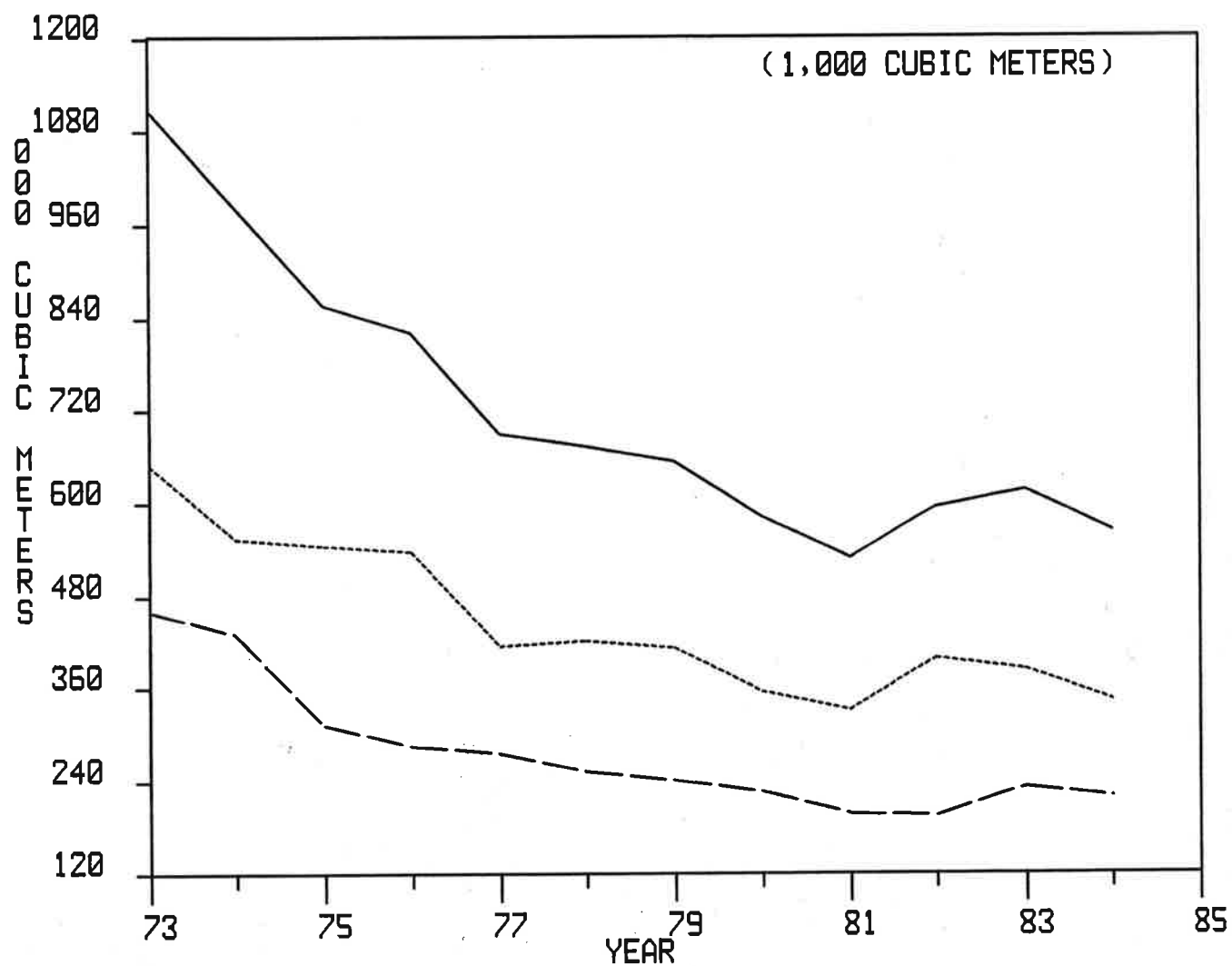


Figure 2. Taiwan Log Production 1972-1983



SOURCE: TAIWAN FORESTRY RESEARCH INSTITUTE

Figure 3. Taiwan Lumber Production 1973-1984

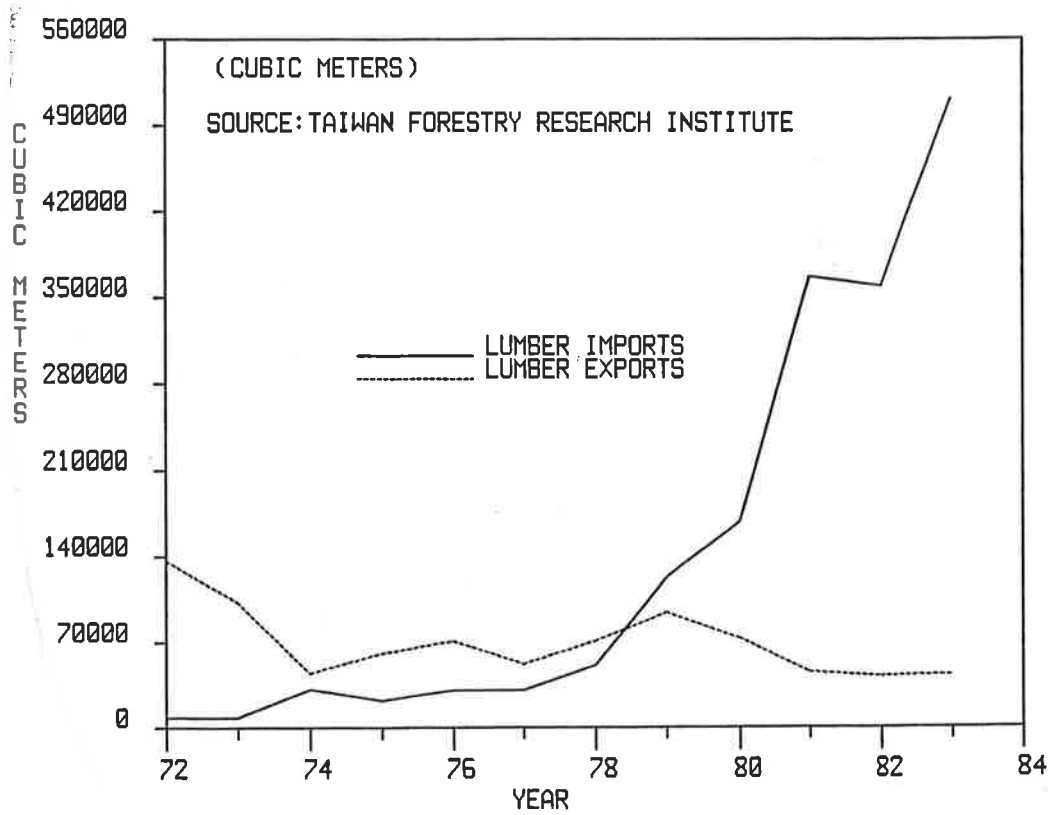


Figure 4. Taiwan Lumber Imports & Exports 1972-1983

Table 19. Plywood Export by Region in 1984.

Country and Area	m ³	%	Amount (US\$)	%
U.S.A.	291,917	48.6	145,691,144	52.0
Canada	29,148	4.8	12,922,704	4.6
Japan	14,275	2.4	7,082,495	2.5
Hong Kong	34,565	5.7	16,196,470	5.8
Australia	29,178	4.9	13,286,357	4.7
England and Europe	52,281	8.7	25,913,904	9.3
Mid-East and Africa	110,368	18.4	45,072,151	16.1
Others	39,020	6.5	13,922,535	5.0
Total	600,652	100.0	280,087,760	100.0

Remark: 1 m³ = 3,700 ft² based on 1/8" thick.

3. Plywood

The plywood industry is the only sector where sales have been waning. In terms of back value and volume, plywood exports overall and particularly new plywood have been declining at a rapid rate (Figure 5). Finished plywood, used for appearance purposes, has also declined but at a slower rate.

Manufacture of plywood began in Taiwan in the 1940s and as production expanded rapidly the country became a world leader in terms of export value. Two decades ago there were only 16 small mills. By 1975 there were 90 large and 25 small mills with a total annual capacity of estimated 7 billion square feet of 1/8" veneer. From 1969 to 1980 total production increased from 210 million to 5 billion square feet. In all years most plywood has been exported (Kwang-Yao Tai, 1985). This pattern of export growth began to reverse in 1979 for two main reasons. First, as the country's economic growth progressed, domestic consumption has increased accordingly. Table 19 shows Taiwan plywood exports by region in 1984.

Secondly, and having a more severe impact, is the increase in international competition. This is highlighted by the case of Indonesia, once the primary source of raw materials (logs) for Taiwan's plywood industries. In the past 6 years Indonesia has not only place a total ban on log exports but also has developed a plywood producing industry that is currently the largest in the world. This situation has not only strained Taiwan's position as a supplier in world markets, but also has shut off a primary means of supply of raw materials. As seen in Table 17, on page 20, in recent years Malaysia has taken over as Taiwan's number one log supplier, but as previously stated Malaysia may also curb log exports.

As competition continues unabated and raw material supply flows become uncertain, Taiwan's plywood industry will continue to decline. In an attempt to mitigate this decline, a number of manufacturers have tended to substitute higher quality diversified products such as decorative plywoods and panels for plain ones. To achieve this, sawnwoods and sliced veneers of high value such as oak, cherry, walnut, and ash have been imported for the face veneers.

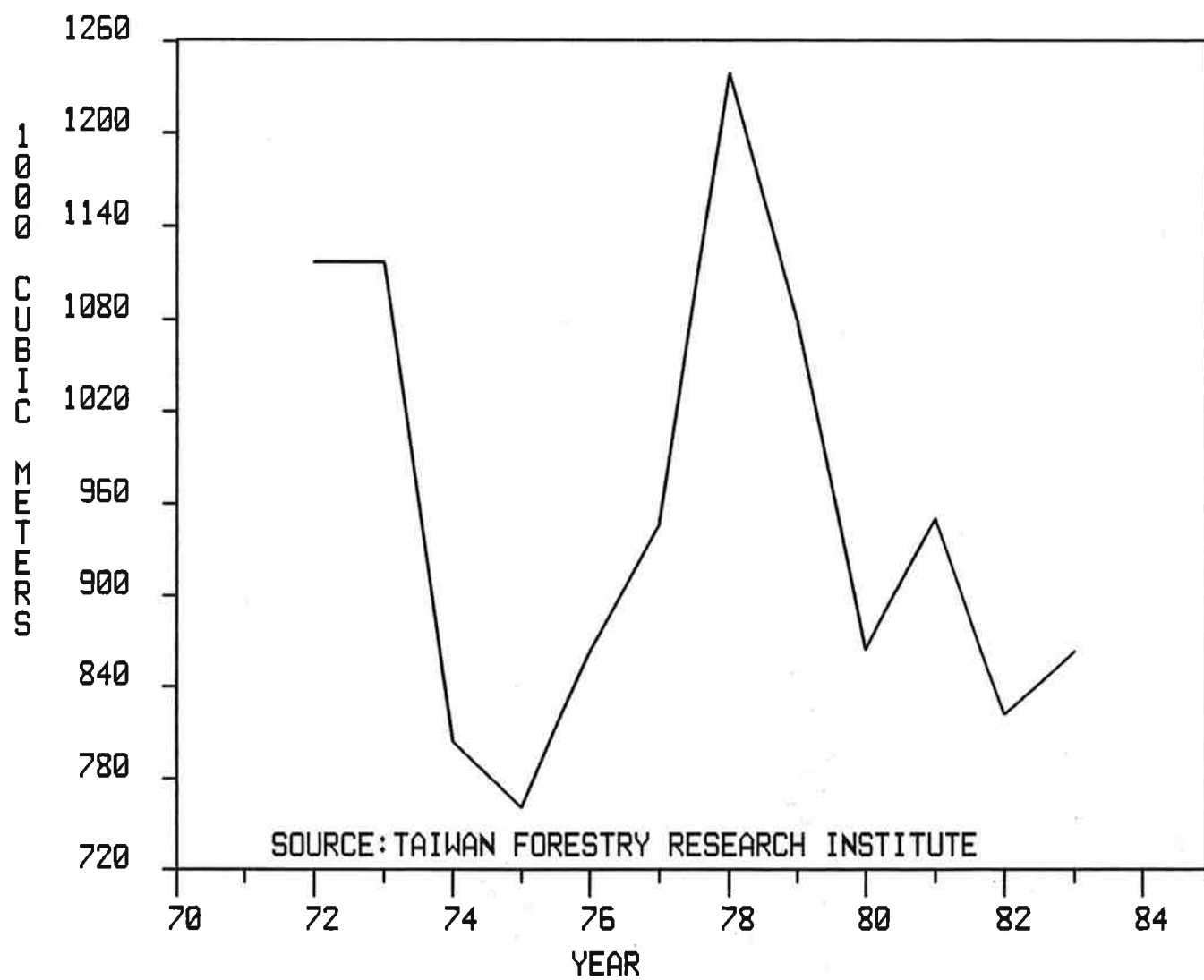


Figure 5. Taiwan Plywood Exports 1972-1983

Table 20. Taiwan Paper and Paperboard Production. 1981 and 1982 Imports and Exports (1,000 tons).

Paper and Board	Production		Imports		Exports	
	1981	1982	1981	1982	1981	1982
Newsprint	52	49	39	46	0	0
Printings/writings	233	258	1	1	27	33
Casemaking materials	663	710	11	na	98	87
of which Kraftliner	407	415	0	na	0	44
Other wrapping appers	173	127	5	25	8	0
Tissue	57	65	0	na	5	7
Other paper	17	16	10	13	2	1
Board	303	332	10	13	31	40
Total Paper and Board	1,498	1,556	76	98	171	168

Reproduced from Pulp and Paper International, July 1983.

4. Pulp and Paper

1) Paper

Concomitantly with swift economic expansion, Taiwan's consumption and production of all major grades of paper have been rising rapidly over the past two decades (see Tables 20 and 21). However, consumption has consistently outstripped domestic production capabilities necessitating an increase in imports in most product categories (see Table 20). Taiwan does export some paper grades, notably kraft linear board and printing and writing paper which constituted 26% and 20% of total paper exports in 1982. Table 22 shows the trend of paper exports over the past 2 decades (PPI annual review, July 1983). Table 20 shows Taiwan's production, exports and imports of all paper grades in 1981 and 1982.

A trend of increasing paper output and capacity has and will continue to exist in Taiwan. Output in 1983 had increased from the previous year in every paper category except newsprint, tissue, and writing paper (see Table 21). A relatively small fraction of this is going into the export market. Not a major paper exporter to begin with, existing export levels are dropping due to weak pricing in world markets for the major paper (and pulp) commodity groups as well as a slowing in growth of most world economies.

Taiwan's total paper manufacturing capacity in 1983 was 1,960,000 metric tons of which 79% was utilized. Production in 1983 increased by 10.6% from the previous year. Scheduled expansions in paper manufacturing capacity in 1984 were expected to increase capacity by 256,000 metric tons, once again primarily to supply domestic consumption PPI, April 1984).

A paper category that deserves special mention because of potential U.S. export opportunities is waste paper. In 1983 wastepaper imports totaled 810,000 tons valued at US\$83.3 million. This was an increase of 20.6% by weight and 28.1% by value from the previous year.

Table 21. Taiwan Paper and Paperboard Output (1983, 1,000 tons)

Paper and Board	1983	% Change 83/82
Newsprint	45	-10.0
Ctd. woodfree	46	+17.4
Other pr/wr	214	- 2.5
Pkg. paper	467	+11.5
Tissue	71	+ 9.1
Other paper	21	+43.5
Kraftliner	462	+11.2
Other board	395	+19.0
Total P & B	1,720	+10.6
Total Exports	123	-26.9

Table 22. Exports of Paper (1961-1984).

Year	Paper	
	M.T.	US\$
1961	13,468	2,340,491
1966	28,584	6,939,883
1971	23,727	6,585,687
1976	27,889	16,442,546
1980	43,127	34,333,803
1981	34,593	27,878,542
1982	41,632	31,439,424
1983	26,857	26,468,620
1984	18,388	20,398,447

The U.S. is the main supplier of waste paper to Taiwan. In 1983, 507,000 tons valued at US\$61.3 million were imported from the U.S. Hong Kong was the second largest with 274,000 tons worth US\$18.5 million. Imports from other sources had increased over 300% from 1982, most notably Canada, New Zealand, Australia, South Africa, and Singapore (PPI, February 1984, p. 43; World Wide News).

Per capita consumption of paper and paper board in Taiwan currently is around 87 kilograms, low compared with 300 kilograms for the U.S. but considerably higher than other developing southeast Asian nations (PPI July 1983 Annual Review and Statistical Abstract of U.S. 1984). For example, in Indonesia in 1984 per capita consumption of paper was only 10 kilograms (Schreuder, Vlosky, 1985).

2). Pulp

As in the case of the paper industry, Taiwan is experiencing increases in production, consumption, imports of market pulp although the growth rate is

Table 23. Taiwan Production, Imports, Exports of Market Pulp, 1981 and 1982. (1,000 tons)

	Production		Imports		Exports	
	1981	1982	1981	1982	1981	1982
Bleached sulfate	257	207	39	73	87	59
Unbleached sulfate	0	0	34	37	0	0
Bleached sulfite	0	0	6	15	0	0
Unbleached sulfite	0	0	0	3	0	0
Semichemical	0	0	1	0	0	0
Mechanical	0	0	0	1	0	0
Other	93	86	4	3	12	13
Total Market Pulp	350	293	84	133	99	72

Reproduced from PPI Annual Review--July 1983.

Table 24. Taiwan Pulp Output--1983 (1,000 tons).

Pulp grade	1983	% change 83/82
Bleached softwood kraft	6	-47.8
Bleached hardwood kraft	210	+ 7.3
Bleached bagasse	77	- 4.8
Other	7	+26.2
Total Pulp	300	+ 2.2
Total Exports	64	-11.3

more modest. With a domestic pulp manufacturing capacity of 400,000 metric tons in 1982 (production was running at only 73% of capacity) (PPI Annual Review, 1983). Table 23 shows production, imports and exports of all major pulp categories in 1981 and 1982. Bleached softwood and hardwood sulfate kraft pulp account for over 70% of production. Pulp manufactured from bagasse makes up most of the remaining 30%. 1983 figures were not much greater as seen by only a 2.2% growth in output from 1982 (see Table 24).

Pulp imports have been rising steadily over the past decade. The U.S. was the number one pulp exporter to Taiwan in 1982 followed by Canada and Sweden. In 1983 the U.S. exported 66,810 metric tons of market pulp to Taiwan. Specific categories of pulp and their contribution to the total were: dissolving and special alpha 46.8%, bleached and semi-bleached softwood sulfate 25.8%, bleached and semi-bleached hardwood sulfate 15.3%, and unbleached 10% (Wood Pulp and Fiber Statistics 1982-1983, American Paper Institute September, 1984).

5. Furniture and Wood-working

The furniture and wood-working industry in Taiwan is large and diversified. The furniture factories range in size from small cottage-type industries to

Table 25. Export of Wooden Furniture and Wood-working Articles.

Year	Wooden furniture	Wood-working articles
	(US\$1,000)	(US\$1,000)
1972	17,871	55,938
1973	39,100	120,213
1974	48,123	123,244
1975	45,173	153,165
1976	64,264	175,759
1977	94,213	199,929
1978	156,555	279,250
1979	230,569	355,045
1980	241,879	384,354
1981	265,963	438,493
1982	389,415	292,893
1983	392,939	354,774
1984	443,170	421,122

Reproduced from Kwang-Yao Tai, 1985.

large integrated furniture plants employing more than 200 people. Altogether, the furniture industry consists of more than 1,100 small and large factories and employs more than 50,000 people. Among the factories, 300 are registered as member companies of Woodworker's Association. The industry produces many different products, from wooden crafts to furniture parts to finished sets of household furniture. The industry has expanded rapidly in the past two decades. Most of the furniture produced for export is limited to part, dimension and knock-down styles (Kwang-Yao Tai, 1985).

In 1982, the value of wooden furniture and wood-working production in Taiwan was valued at US\$73,849,000. In 1984 it was US\$864,292,000. That is a 11-fold increase in 13 years. The major markets are U.S.A., Japan and the Middle East. With the increase in volume has come an increase in quality, and some furniture is now exported to Denmark, a very demanding market. Table 25 shows the rapid rise in Taiwan's furniture exports.

VI. FOREIGN INVESTMENT OPPORTUNITIES

1. Present attitude/policy. Foreign investment plays a strong role within the framework of Taiwan's economic development strategy. The already favorable climate for foreign investment will improve as shifts in economic policy lead toward greater reliance on high technology, capital intensive industries. The government is currently liberalizing investment policy and procedures in a diversity of industrial sectors and, in deviating from past policy, is allowing for foreign investment in the production of goods for the domestic market as well as in selected trading and state-run companies.

The incentives for foreign investment are numerous. Among them are generous tax benefits, a highly developed infrastructure, established industrial districts and export processing zones, a growing domestic market, a well

educated and industrious work force, absence of labor disputes or disruptions, and political and economic stability.

From 1952 to 1983 aggregate foreign investment in Taiwan was \$64.4 billion of which US\$1.1 billion was invested by overseas Chinese, mostly Hong Kong residents, and the remainder by non-Chinese foreign nationals. The major industrial sector targeted for foreign investment is the electronics industry with 39% of the \$1.1 billion invested. Other major industries are the chemical, machinery, and basic metal and metal products sectors. Generally, any investment that introduces advanced technology has strong export potential or creates domestic opportunities is encouraged (U.S. Department of Commerce, Marketing in Taiwan, Nov. 1985).

The United States is the number one foreign investor in Taiwan after Chinese foreign nationals with \$1.38 billion in investment approvals from 1952 to 1983. Japan follows with \$985 million over this period. Major U.S. industries investing in Taiwan are RCA, Zenith, IBM and General Instrument which are involved in the electronics industry (U.S. Department of Commerce, Marketing in Taiwan, Nov. 1985).

VII. SUMMARY

This paper examined the structural changes that have occurred in Taiwan's forest products sector over the past four decades and how these changes influence Taiwan's participation in world forest products trade. The limiting capacity of forest resources in Taiwan has allowed foreign wood producers to serve the plywood, lumber, and furniture industries. The plywood industry has lost its comparative advantage since the early 1980's when the Indonesian plywood expanded coupled with its log export ban policy. The Taiwan solid wood sector has shifted into more value added processes such as furniture manufacturing. As the furniture industry became prosperous recently, the hardwood lumber import has increased at a fast rate. In 1986 the Taiwan furniture captured about 40% of the U.S. furniture market. The consumption of pulp and paper products has increased along with the economic growth, and the domestic industry has been able to supply its own needs, except waste paper and a few specialty categories such as dissolving pulp.

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APPENDIX A

U.S. Forest Products
Imports and Exports
to Taiwan by Product
1978-1983

Table A-1. WOOD PRODUCTS: U.S. IMPORTS, COUNTRY BY COMMODITY, 1978-1983
(Page 1 of 4) U.S. imports for consumption

(In thousands of dollars; customs value basis)

Country/Commodity	1978	1979	1980	1981	1982	1983	1984	1985
Taiwan								
Hardwood logs	--	--	--	12	--	76		
Poles, piles and posts	5	8	--	10	2	1		
Softwood lumber	--	--	--	7	24	92		
Hardwood lumber	3,635	5,369	2,873	2,013	2,096	2,731		
Hardwood flooring	17	72	--	90	12	22		
Siding	--	--	--	1	--	--		
Molding	5,479	6,893	5,678	6,738	7,411	7,595		
Treated and edge-glued lumber and siding	939	793	894	436	208	77		
Softwood veneer	--	9	--	8	23	1		
Hardwood veneer	1,953	1,191	386	621	362	379		
Softwood plywood	3,192	761	1,125	1,155	869	1,875		
Hardwood plywood	153,413	190,235	124,944	148,197	111,404	151,565		
Hardboard	9	--	--	37	--	80		
Particleboard	22	--	--	1	--	25		
Cellular wood panels	1	1	--	--	--	39		
Gypsum and plaster board	--	--	--	--	4	--		
Other panel products	--	1	1	6	123	102		
Other wood products	94,054	111,120	119,969	122,706	124,119	180,344		
Total	262,718	316,454	255,871	282,038	246,659	345,004		

Table A-1.
(Page 2 of 4)

WOOD PRODUCTS: U.S. EXPORTS, COUNTRY BY COMMODITY, 1978-1983
U.S. Domestic exports
(Quantities*, in units)

Country/Commodity	1978	1979	1980	1981	1982	1983	1984	1985
Taiwan								
Hardwood logs	--	--	--	11	--	156		
Poles, piles and posts	6,175	35,000	--	3,900	3,501	2		
Softwood lumber	--	--	--	35	65	360		
Hardwood lumber	5,970	6,765	3,266	7,348	3,321	4,661		
Hardwood flooring	108	437	--	129	4	16		
Siding	--	--	--	3	--	--		
Molding	40,406	18,025	8,532	8,963	7,465	8,389		
Treated and edge-glued lumber and siding	3,843	1,113	894	530	178	83		
Softwood veneer	--	924	--	14	100	10		
Hardwood veneer	28,337	12,533	2,501	4,581	4,695	4,308		
Softwood plywood	26,093	5,034	7,424	7,693	5,759	12,497		
Hardwood plywood	1,752,778	1,523,123	859,823	1,080,857	850,590	1,124,555		
Hardboard	23	--	--	57	--	113		
Particleboard	189,725	--	--	267	--	76,067		
Cellular wood panels	31	1	--	--	--	157		
Gypsum and plaster board	--	--	--	--	5,891	--		
Other panel products	--	264	129	3,998	168,072	118,746		
Other wood products	--							
Total								

* For units of quantity, see Notes to Trade Tables following.

Table A-1.
(Page 3 of 4)

WOOD PRODUCTS: U.S. EXPORTS, COUNTRY BY COMMODITY, 1978-1983
U.S. domestic exports

(In thousands of dollars; f.a.s. value basis)

Country/Commodity	1978	1979	1980	1981	1982	1983	1984	1985
Taiwan								
Softwood logs	3,750	2,177	548	938	2,130	713		
Hardwood logs	1,321	1,726	1,714	2,930	3,936	7,168		
Poles, piles and posts	--	--	9	200	--	--		
Wood chips	2	--	--	--	--	--		
Softwood lumber	4	1,483	1,463	961	848	664		
Hardwood lumber	891	1,309	1,955	7,014	7,550	24,412		
Hardwood flooring	--	--	85	97	78	61		
Softwood molding	--	--	22	--	--	272		
Hardwood molding	--	--	--	--	--	3		
Treated lumber, flooring, siding, and molding	--	7	--	--	19	11		
Hardwood railroad ties	--	--	--	--	75	--		
Softwood veneer	--	244	43	80	71	130		
Hardwood veneer	522	483	754	1,500	2,439	3,866		
Softwood plywood	1	--	85	126	5	238		
Hardwood plywood	42	36	43	99	32	15		
Hardboard	--	16	90	984	2,478	417		
Particleboard	81	198	680	1,678	1,022	3,414		
Cellular wood panels	--	--	--	--	40	12		
Gypsum and plaster board	68	208	19	170	267	118		
Other panel products	27	2	102	742	487	262		
Other wood products	969	511	389	580	743	488		
Total	7,677	8,403	8,000	18,098	22,221	42,264		

Table A-1.
(Page 4 of 4)

WOOD PRODUCTS: U.S. EXPORTS, COUNTRY BY COMMODITY, 1978-1983
U.S. domestic exports

(Quantities*, in units)

Country/Commodity	1978	1979	1980	1981	1982	1983	1984	1985
Taiwan								
Softwood logs	3,843	2,236	1,050	3,683	6,580	2,394		
Hardwood logs	1,257	1,517	1,743	3,810	5,681	9,345		
Poles, piles and posts	--	--	206	3,424	--	--		
Wood chips	87	--	--	--	--	--		
Softwood lumber	8	3,063	2,792	2,378	2,576	1,855		
Hardwood lumber	753	1,351	3,196	9,503	9,971	30,223		
Hardwood flooring	--	--	117	66	316	132		
Softwood molding	--	--	553	--	--	14,120		
Hardwood molding	--	--	--	--	--	105		
Treated lumber, flooring, siding, and molding	--	46	--	--	20	10		
Hardwood railroad ties	--	--	--	--	309	--		
Softwood veneer	--	2,524	414	618	492	2,519		
Hardwood veneer	8,367	6,963	6,401	31,610	24,219	33,586		
Softwood plywood	1	--	703	797	7	269		
Hardwood plywood	554	405	459	752	144	72		
Hardboard	--	45	208	3,028	8,226	1,251		
Particleboard	513,974	966	3,609	6,189	4,299	14,100		
Cellular wood panels	--	--	--	--	28	49		
Gypsum and plaster board	5,750	1,411	85	725	1,003	321		
Other panel products	126,443	2	562	3,766	1,442	1,832		
Other wood products								
Total								

* For units of quantity, see Notes to Trade Tables following.

Table A-2.
(Page 1 of 4)

WOOD PRODUCTS: U.S. IMPORTS BY WORLD AREAS BY COMMODITY GROUPS 1978-1983
PREPARED BY FOREST PRODUCTS DIVISION
USDA FOREIGN AGRICULTURAL SERVICE
U.S. imports for consumption

(In thousands of dollars; customs value basis)

Country/Commodity	1978	1979	1980	1981	1982	1983	1984	1985
Asia								
Softwood logs	1	19	--	--	--	--		--
Hardwood logs	284	438	167	222	185	306		306
Poles, piles and posts	13	36	34	11	18	13		13
Wood chips	1	1	3	1	--	97		97
Softwood lumber	258	165	69	131	130	366		366
Hardwood lumber	44,114	81,125	45,147	48,347	29,627	45,989		45,989
Softwood Flooring	208	254	53	15	199	4		4
Hardwood flooring	12,019	17,730	11,337	5,159	4,273	4,631		4,631
Siding	676	984	444	275	126	78		78
Molding	28,201	34,339	20,540	22,740	18,920	21,738		21,738
Treated and edge-glued lumber and siding	1,453	1,420	1,639	899	481	231		231
Railroad ties	--	--	--	--	2	3		3
Softwood veneer	123	48	11	238	220	148		148
Hardwood veneer	20,172	24,955	18,253	22,226	9,679	21,874		21,874
Softwood plywood	6,003	3,771	6,414	4,667	2,073	3,644		3,644
Hardwood plywood	480,600	543,656	356,380	413,943	290,270	395,618		395,618
Hardboard	1,074	601	314	792	82	121		121
Particleboard	28	174	2	2	2	141		141
Cellular wood panels	2	3	1	1	7	55		55
Gypsum and plaster board	4	--	1	--	4	78		78
Other panel products	--	76	1	7	135	149		149
Other wood products	162,761	188,222	196,633	199,595	193,887	258,935		258,935
Total	758,024	898,015	657,439	719,271	550,322	754,218		754,218

Table A-2.
(Page 2 of 4)

WOOD PRODUCTS: U.S. IMPORTS BY WORLD AREAS BY COMMODITY GROUPS 1978-1983
PREPARED BY FOREST PRODUCTS DIVISION
USDA FOREIGN AGRICULTURAL SERVICE
U.S. imports for consumption

Country/Commodity	1978	1979	1980	1981	1982	1983	1984	1985
(Quantities*, in units)								
Asia								
Softwood logs	--	44	--	--	--	--		
Hardwood logs	465	1,048	154	557	387	1,746		
Poles, piles and posts	18,023	162,509	32,880	3,920	49,181	2,142		
Wood chips	2	--	156	1	--	3,992		
Softwood lumber	655	583	228	397	301	827		
Hardwood lumber	95,380	127,265	69,509	75,688	43,061	69,888		
Softwood flooring	452	187	35	15	565	8		
Hardwood flooring	16,335	17,032	8,480	3,925	6,416	5,041		
Siding	4,235	3,230	1,144	861	334	215		
Molding	362,998	319,460	168,501	207,463	170,756	172,412		
Treated and edge-glued, lumber and siding	5,927	2,495	1,991	1,651	951	413		
Hardwood railroad ties	--	--	--	--	4	15		
Softwood veneer	2,002	2,496	986	4,288	2,561	1,604		
Hardwood veneer	536,835	482,555	300,079	398,261	149,828	365,947		
Softwood plywood	45,350	18,887	30,487	24,176	11,076	19,549		
Hardwood plywood	4,922,155	4,039,545	2,290,450	2,884,414	2,146,282	3,205,557		
Hardboard	5,148	3,392	1,853	4,219	400	164		
Particleboard	231,720	1,552,936	6,200	1,172	12,955	895,313		
Cellular wood panels	31	3	3	2	36	321		
Gypsum and plaster board	3,411	--	240	--	5,891	32,087		
Other panel products	--	188,464	129	4,048	219,264	392,001		
Other wood products								
Total								

1 Value of quantity less than 0.5.

Source: Compiled from official statistics of the U.S. Department of Commerce.
For units of quantity, see Notes to Trade Tables following.

Table A-2.
(Page 3 of 4)

WOOD PRODUCTS: U.S. EXPORTS BY WORLD AREAS BY COMMODITY GROUPS 1978-1983
PREPARED BY FOREST PRODUCTS DIVISION
USDA FOREIGN AGRICULTURAL SERVICE
U.S. domestic exports

(In thousands of dollars; f.a.s. value basis)

Country/Commodity	1978	1979	1980	1981	1982	1983	1984	1985
Asia								
Softwood logs	1,034,836	1,555,830	1,408,338	965,510	1,137,908	1,012,980		
Hardwood logs	12,124	17,921	14,923	13,823	14,787	16,398		
Poles, piles and posts	2,797	5,584	5,229	991	2,465	2,451		
Wood chips	148,112	180,744	358,596	236,491	206,783	156,997		
Softwood lumber	123,027	259,479	226,720	192,481	206,651	196,557		
Hardwood lumber	4,573	6,254	11,637	21,591	21,509	46,337		
Softwood flooring	4	19	--	--	--	2		
Hardwood flooring	171	631	558	1,312	1,288	1,596		
Softwood siding	--	15	10	16	15	17		
Hardwood siding	--	--	43	10	--	--		
Softwood molding	17	82	74	69	211	636		
Hardwood molding	177	54	124	37	54	113		
Treated lumber, flooring, siding, and molding	510	509	245	1,282	1,296	317		
Hardwood railroad ties	9	--	--	--	75	3		
Softwood veneer	26	530	413	412	2,221	2,563		
Hardwood veneer	1,197	1,168	1,527	2,848	5,394	8,808		
Softwood plywood	1,150	2,356	2,433	2,678	2,683	2,171		
Hardwood plywood	680	288	406	334	203	200		
Hardboard	88	40	354	2,506	3,585	2,312		
Particleboard	644	2,097	5,684	4,396	3,022	7,258		
Cellular wood panels	9	82	31	138	196	329		
Gypsum and plaster board	758	862	956	2,083	2,799	3,449		
Other panel products	415	251	882	1,131	1,066	1,593		
Other wood products	14,041	19,485	24,300	26,240	24,804	23,543		
Total	1,345,365	2,054,282	2,063,482	1,476,379	1,639,016	1,486,631		

Table A-2.
(Page 4 of 4)

WOOD PRODUCTS: U.S. EXPORTS BY WORLD AREAS BY COMMODITY GROUPS 1978-1983
PREPARED BY FOREST PRODUCTS DIVISION
USDA FOREIGN AGRICULTURAL SERVICE
U.S. domestic exports

Country/Commodity	1978	1979	1980	1981	1982	1983	1984	1985
(Quantities*, in units)								
Asia								
Softwood logs	2,964,952	3,401,465	2,821,574	2,156,147	2,829,597	3,069,810		
Hardwood logs	8,143	10,377	15,224	11,725	13,198	17,855		
Poles, piles and posts	152,008	106,510	138,644	191,904	320,334	203,557		
Wood chips	3,436,313	4,133,665	4,138,392	2,767,127	2,508,090	2,288,395		
Softwood lumber	414,026	651,499	646,697	559,290	640,230	727,105		
Hardwood lumber	4,279	7,997	17,964	29,688	27,684	64,771		
Softwood	7	29	--	--	--	6		
Hardwood flooring	385	737	1,418	3,463	3,674	5,952		
Softwood siding	--	15	15	15	72	87		
Hardwood siding	--	--	64	40	--	--		
Softwood molding	379	3,044	1,538	1,517	5,117	33,683		
Hardwood molding	3,741	912	3,322	757	927	1,108		
Treated lumber, flooring, siding, and molding	1,021	506	282	1,279	2,059	751		
Hardwood railroad ties	15	--	--	--	309	13		
Softwood veneer	889	7,120	7,429	3,922	85,306	110,784		
Hardwood veneer	28,897	21,175	12,312	43,928	60,949	86,617		
Softwood plywood	2,893	6,778	9,382	8,202	8,287	6,744		
Hardwood plywood	887	630	1,010	1,316	869	701		
Hardboard	170	114	1,127	7,666	11,846	8,663		
Particleboard	1,105,920	12,909	36,523	15,665	13,562	32,312		
Cellular wood panels	21	150	33	236	338	655		
Gypsum and plaster board	167,779	5,194	4,460	7,625	11,953	14,761		
Other panel products	568,840	499	3,276	5,348	2,890	4,736		
Other wood products								
Total								

Source: Compiled from official statistics of the U.S. Department of Commerce.
For units of quantity, see Notes to Trade Tables following.

NOTES TO TRADE TABLES

1. Units of quantity are as shown below:

Item	U.S. Exports	U.S. Imports
Softwood logs	Thousand board feet	Thousand board feet
Hardwood logs	Thousand board feet	Thousand board feet
Poles, piles, etc.	Number	Number
Wood chips	Short tons	Short tons
Softwood lumber	Thousand board feet	Thousand board feet
Hardwood lumber	Thousand board feet	Thousand board feet
Softwood flooring	Thousand board feet	Thousand board feet
Hardwood flooring	Thousand board feet	Thousand board feet
Siding		Thousand square feet
Softwood	Thousand board feet	1
Hardwood	Thousand board feet	1
Molding		2
Softwood	Thousand linear feet	1
Hardwood	Thousand linear feet	1
Treated lumber, etc. ³	Thousand board feet	Thousand board feet
Railroad ties		Thousand board feet
Softwood	Thousand board feet	1
Hardwood	Thousand board feet	1
Softwood veneer	Thousand square feet	Thousand square feet
Hardwood veneer	Thousand square feet	Thousand square feet
Softwood plywood	Thousand square feet	Thousand square feet
Hardwood plywood	Thousand square feet	Thousand square feet
Hardboard ⁴	Short tons	Short tons
Particleboard	Thousand square feet	Pounds
Cellular wood panels	Thousand square feet	Thousand square feet
Gypsum and plaster bd.	Thousand square feet	Pounds
Other panel products ⁵	Thousand square feet	Pounds
Other wood products ⁶	2	2

¹ Comparable item is not reported for imports.

² Exports or imports of this item include several commodities with different units of quantity, therefore the units shown in the quantity table are meaningless.

³ Exports of treated lumber, siding, flooring, and molding. Imports of drilled or treated lumber and siding, and edge-glued or end-glued wood not over 6 feet in length or over 15 inches in width.

⁴ Includes fiberboards with a density equal to or greater than 31 pounds per cubic foot.

⁵ Includes such products as laminated boards, and fiberboards with a density less than 31 pounds per cubic foot.

⁶ Includes such products as wood waste, building components, containers, and small woodenware.