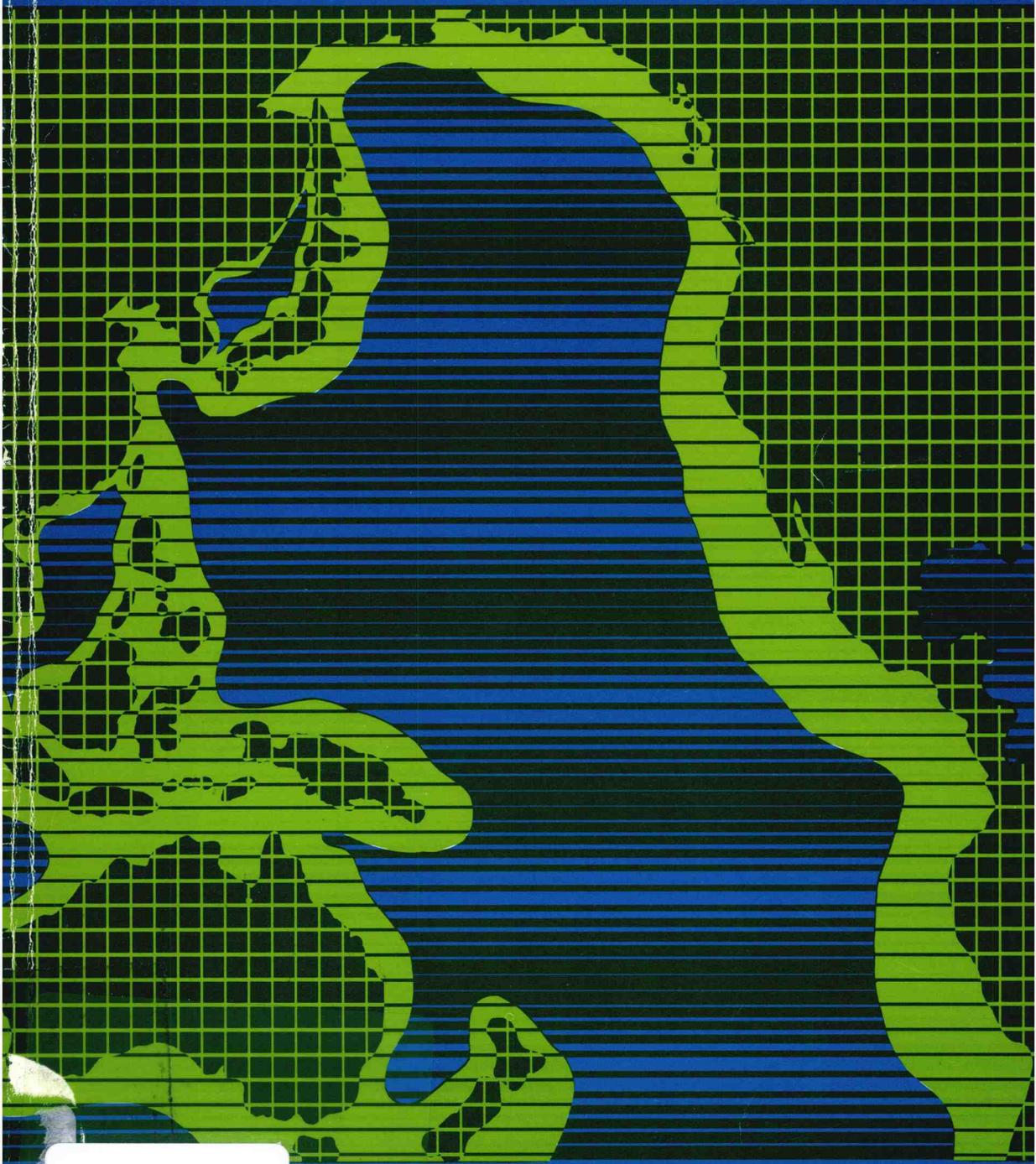


Renewable Resources in the Pacific

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Conference, held in Vancouver, Canada, 7-11 September 1981



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Proceedings of the 12th Pacific Trade and
Development Conference, held in Vancouver, Canada,
7-11 September 1981

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Pacific Trade and Investment in Forest Products

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Trade and investment in forest products among Pacific-area countries have increased more slowly in the last 10 years than in the preceding decade. However, growth in production and exports from many developing countries of the area has been greater since 1969. For Pacific countries as a group, four related factors have primarily influenced recent growth in forest-products trade and investment. First, world economic conditions in the aftermath of the oil-price increases of 1973 and later years have resulted in slower growth in principal end-use markets for forest products, e.g., housing construction, industrial packaging, printing and publishing. Second, manufacturing costs have risen sharply with the direct inflationary impact of higher oil prices on wood, energy, and capital costs and their indirect impact on labour costs. Third, capital costs of minimum economic plant size, mainly in the capital-intensive, pulp-and-paper industry, have escalated to the point where "greenfield" investments are rare. Finally, the availability of other sources of low-cost timber has diminished. For some developing countries of the Pacific, higher growth has resulted from increased domestic demand associated with industrialization and from expanded manufacturing capacity to process existing mature-timber reserves or fast-growing plantation forests. Further restructuring of forest-product trade and investment is implied by these developments and by regulation of raw-timber exports to recover greater revenues from forest resources and to capture industrial benefits of increased domestic processing of indigenous timber resources.

L'accroissement des investissements et du commerce des produits forestiers entre les pays de la région du Pacifique a été moins rapide au cours de la dernière décennie que pendant la précédente. Cependant, plusieurs pays en développement de cette région ont accru leur production et leurs exportations depuis 1969. Pour l'ensemble des pays, les quatre facteurs suivants ont principalement contribué au ralentissement de la croissance de ce secteur : premièrement, la situation économique mondiale, après l'augmentation du pétrole en 1973 et au cours des années suivantes, a freiné la demande des principaux marchés des produits finis tels que la construction d'habitations, le conditionnement, et les pâtes et papier. Deuxièmement, les coûts de fabrication ont accusé une hausse marquée, cause directe de l'impact inflationniste produit par l'augmentation du pétrole sur le bois, l'énergie et les coûts du capital qui se sont répercutés sur les coûts de la main-d'oeuvre. Troisièmement, le coût en capital de l'établissement de petites usines, surtout dans l'industrie papetière à forte proportion de capital, a augmenté au point de freiner le développement de ce secteur. Enfin, la disponibilité des autres sources de bois de construction à bon marché a aussi diminué. La croissance enregistrée dans certains pays en développement de la région du Pacifique provient de l'augmentation de la demande domestique associée à l'accroissement de l'industrialisation ainsi que de l'extension de la capacité manufacturière au traitement des peuplements en réserves ou des plantations d'essences à croissance rapide. Il s'impose de restructurer le commerce et les investissements dans ce secteur et de régler les exportations de bois brut afin d'augmenter les revenus provenant des richesses forestières et des nouvelles capacités de traitement industriel.

The countries of the Pacific area produce and consume most of the world output of industrial wood and wood products. They also import about 44% and export some 52% of all forest products traded on world markets. Intra-regional trade dominates the pattern of world trade in

Table 1. Value-added (\$U.S. million) in forest-products industries in selected Pacific-area countries, 1977.

	Wood	Paper and allied	Total value-added (%) of value-added in all manufacturing
Australia	859	573	6.7
Canada	2594	3732	14.9
Chile ^a	0.07	0.15	6.7
Colombia ^a	24	101	4.0
Ecuador ^a	13	18	5.4
Indonesia	62	34	5.2
Japan	6085	6410	5.9
Malaysia ^b			
Peninsular	92	9	11.1
Sabah	6	-	40.6
Sarawak	20	-	49.4
Mexico ^a	121	376	na ^c
New Zealand ^a	158	151	11.1
Papua New Guinea	18	7	15.8
Peru	63	102	4.6
Philippines	71	89	9.1
Singapore	57	19	4.1
United States	12190	21880	5.8

^aData are for 1976.

^bData are for 1974.

^cna = not available.

Source: Various yearbooks of industrial statistics from the UN.

forest products from these countries. The capacity to supply major shares of domestic and international markets has resulted in part from large investments in timber-processing plants and equipment. For example, 68% of world capacity to produce paper and paperboard and 73% of world wood-pulp capacity were located in Pacific countries in 1978. The combined benefits of foreign-exchange earnings from forest-products trade and value-added and employment from forest-product investments continue to contribute significantly to meeting the broad economic and social-development objectives of many countries in the region.

Forest-Product Industries

Industries in Pacific countries produce 77% of the world output for coniferous roundwood and 67% of its nonconiferous wood output for industrial use. They also account for more than half of the world production of pulp, paper, lumber, and wood-based panels. The potential to maintain or increase shares of the world's output of forest products depends on the relative cost and avail-

ability of industrial inputs in the respective countries, e.g., labour, capital, energy, and forest resources.

Most countries of the area actively pursue the objective of increased domestic processing of their forest resources and primary wood products prior to export. A major benefit of domestic processing is the value added to the resources originating in the forest industries. Among Pacific-area countries, for which comparable data are available, value-added in the forest industries has varied from 4% of that in all manufacturing in Colombia in 1976 to about 49% in Sarawak in 1974 (Table 1). For most countries, the share exceeded 5% in 1976. In all countries other than those of Oceania, Indonesia, and Singapore, value-added in the paper and allied industries was greater than that in the wood industries, partly because of the greater degree of processing in the former.

A closely related industrial benefit is the direct employment generated by the manufacture of forest products. The forest-products industries in

Table 2. Employment (1000 persons) in forest-products industries in selected Pacific-area countries, 1977.

	Wood	Paper and allied	Total forest-products employees (%) of all employees in manufacturing
Australia	50	28	6.7
Canada	109	123	13.6
Chile ^a	13	7	9.1
Colombia	8	11	4.2
Ecuador	3	2	7.1
Indonesia	40	9	6.2
Japan	451	288	7.3
Malaysia ^b			
Peninsular	38	3	16.1
Sabah	2	-	35.5
Sarawak	8	-	53.8
Mexico	5	27	na ^d
New Zealand ^a	14	10	9.1
Papua New Guinea	4	1	29.5
Peru ^c	5	5	4.7
Philippines	42	15	8.4
Singapore	9	4	5.9
United States	523	627	6.2

^aData are for 1976.

^bData are for 1974.

^cData are for 1973.

^dna = not available.

Source: Various issues of the yearbooks of industrial statistics of the UN.

the region accounted for a low of 4.2% (Colombia, in 1976) and a high of 53.8% (Sarawak, in 1974) of all workers involved in manufacturing (Table 2). For most countries in the region, the proportion is greater than 6%. Furthermore, domestic processing creates indirect employment in industries supplying services and equipment to the forest-products industries and employees.

Increased export earnings are often ranked as a greater priority in the development of trade and investment strategies than are value-added and employment. Canada and Asia-Pacific countries other than Japan, China, and the USSR were the principal net forest-product exporting countries in 1979 (Table 3). Leading net importers were Japan and the United States; outside the Pacific area, countries of the European Economic Community were major importers.

Table 3. World forest-products trade (U.S.\$ million), 1979.^a

	Exports	Imports
Pacific-area countries	23574 (52)	23746 (44)
Canada	8151	586
United States	5702	8293
South-Central America	958	1468
Oceania	570	701
Japan	516	8873
China	444	520
Other Asia-Pacific	4675	2703
USSR	2558	602
Europe	20935 (46)	27113 (51)
Other countries	1127 (2)	2603 (5)
World	45636 (100)	53462 (100)

^aFigures in parentheses are percent of totals.

Source: Various issues of the FAO Yearbook of forest products, Rome, Italy, FAO.

Forest Resources and Production¹

The availability of secure supplies of timber at low cost has become a principal factor in determining investments in processing capacity and in efforts to restructure the flow of forest-products trade. In most countries in the area, the growth in industrial wood supplies in the region toward the end of the century promises to be much slower than that of the last two decades for both coniferous and nonconiferous industrial wood production. The exceptions are countries in South-Central America and the Asia-Pacific region (excluding Japan) (Tables 4 and 5).

In Canada, timber harvests of $162 \times 10^6 \text{ m}^3$ in 1979, predominantly softwoods, represented about 60% of the estimated annual allowable cut from all forestlands. Although harvests are expected to increase at reduced rates to about 88% of the current allowable cut ($256 \times 10^6 \text{ m}^3$) by 2000, they may not be sustainable for four reasons: timberlands may be withdrawn from production and reallocated for other uses; second-growth forests may produce reduced yields; natural regeneration rates may be lower than anticipated because of the effects of past logging practices; and the reforestation effort may be less than required (Aird and Ottens 1980).

The United States produces and consumes more industrial wood than any other country. Despite the anticipated shift in importance of internal-supply sources — the shift from the fir forests of the Pacific northwest to the relatively fast-growing pine forests of the South — the U.S. is expected to remain a net importer of wood products in the next 20 years (United States

¹The data in this section have been taken from FAO yearbooks of forest products unless otherwise indicated.

Table 4. World production (10^6 m^3) of coniferous industrial wood, 1959-79.

	1959	1969	1979	Average annual change (%)	
				1959-69	1969-79
Pacific-area countries	601	688	765	1.4	1.1
Canada	78	111	146	3.6	2.8
United States	211	238	258	1.2	0.8
South-Central America	15	20	35	2.9	5.8
Oceania	6	10	12	5.2	1.8
Japan	34	28	20	-2.0	-3.4
Other Asia-Pacific	22	28	42	2.4	4.1
USSR	235	253	252	0.7	0.0
Other countries	159	191	232	1.8	2.0
World	760	879	997	1.5	1.3

Source: Various issues of the FAO Yearbook of forest products, Rome, Italy, FAO.

Table 5. World production (10^6 m³) of nonconiferous industrial wood, 1959–79.

	1959	1969	1979	Average annual change (%)	
				1959–69	1969–79
Pacific-area countries	168	227	283	3.0	2.2
Canada	5	7	11	3.4	4.6
United States	60	72	73	1.8	0.1
South-Central America	20	25	40	2.3	4.8
Oceania	9	10	13	1.1	2.7
Japan	9	18	12	7.2	-4.1
Other Asia-Pacific	30	62	102	7.5	5.1
USSR	35	33	32	-1.0	-0.3
Other countries	78	125	140	4.8	1.1
World	246	352	423	3.6	1.8

Source: Various issues of FAO Yearbook of forest products, Rome, Italy, FAO.

Department of Agriculture, Forest Service 1980). Declining inventories of mature timber on private forestlands, slower expansion of allowable harvests from national forests, and withdrawals of forestlands for other uses have combined to reduce the availability of timber from the northwest.

Whereas Japan is the second-largest consumer of forest products in the Pacific, in 1979 it produced only 36% of its industrial roundwood requirements. Although additional supplies are expected from domestic forests replanted in the post-War period, only 43% of consumption is forecast to be supplied domestically by 1996 (Japan, Ministry of Agriculture and Forestry 1978).

The forests of the USSR hold 55% of world softwood reserves distributed over an extensive area. Western and central southern regions have been extensively harvested for internal wood requirements and exports, primarily to western Europe. Exploitation of northern and remote eastern regions has begun and could benefit from the infrastructure for hydroelectric and railway development in those regions, particularly in Siberia, which is a major source of softwood logs and lumber for Japan. The future impacts are difficult to assess as rugged terrain and a severe climate are constraints to extensive forest operations in the remote and sparsely populated eastern regions (North and Solecki 1977).

The countries of the South Pacific, or Oceania, significantly increased their production of industrial wood between 1959 and 1979 from 6×10^6 m³ to 12×10^6 m³ for coniferous wood and from 9×10^6 m³ to 13×10^6 m³ for nonconiferous. This trend is expected to continue and will probably be supported by the large natural forests of Papua New Guinea and the fast-growing radiata pine plantations of New Zealand and, to a lesser

extent, some parts of Australia (de Vries 1978).

The largest increases in industrial wood production among the world regions occurred in South-Central America (from 15×10^6 m³ and 20×10^6 m³ in 1959 for coniferous and nonconiferous wood, respectively, to 35×10^6 m³ and 40×10^6 m³ in 1979). Leading producers of coniferous industrial wood are Brazil, Chile, and Mexico, whereas most nonconiferous industrial wood is produced in Brazil, Colombia, Ecuador, Peru, Costa Rica, and Paraguay. Brazil, with the large natural hardwood forests of the Amazon Basin and the softwood forests of its southeastern region, will continue to be the dominant producing country in this area. The natural forests of South America have been heavily depleted and reduced in area by shifting cultivation in agriculture and by logging practices that are unfavourable to natural forest regeneration. Its large mixed hardwood forests have either been exploited for their most valuable species or are unused because commercial uses, except for relatively few species, have been slow to develop. Potentially large additional supplies are expected from fast-growing, industrial plantations of eucalyptus and gmelina pine, again, mostly in Brazil but also in Chile, Argentina, and Uruguay (Lanly and Clement 1979).

The countries of the Asia-Pacific area, other than Japan, as a group, produced the largest quantities of nonconiferous industrial wood in 1969 (62×10^6 m³) and 1979 (102×10^6 m³). Moreover, production increases in nonconiferous wood in both decades before 1979 were larger than for any other region. Indonesia, Malaysia, and the Philippines were the largest producers. Supplies have been based on the use of dipterocarp species with similar commercial characteristics, e.g., merantis and lauans. Past logging practices, severe depletion, shifting cultivation, and

fuelwood removals have led to dwindling resources, particularly in the Philippines and Peninsular Malaysia. Restrictions have been placed on log exports to conserve resources, to promote further domestic processing of logs, and to produce greater economic rents from the increasingly scarce timber resources.

Trade: Structure, Changing Patterns, and Issues

World exports of forest products in 1979 were valued at U.S.\$46 billion. Pacific countries accounted for 52%, with the balance being exported mostly from western Europe. Among Pacific countries, Canada netted the highest export earnings from forest products — about U.S.\$8 billion — followed by the USSR and Asia-Pacific countries (other than Japan and China) at about U.S.\$2 billion each (UN 1977). Japan, the United States, and, to a lesser extent, South-Central America, Oceania, and China were net importers of forest products. As a result of the growing interdependency among Pacific countries, forest-product trade has been increasing relatively faster than consumption.

The five principal trade flows of forest products among Pacific countries are: first, exports of newsprint, wood pulp, and softwood lumber from Canada to the United States and, to a much lesser extent, a reverse flow of lumber and paper products to Canada; second, exports of logs, lumber, wood chips, and wood pulp from the United States to Japan; third, exports of softwood lumber and wood pulp from Canada to Japan; fourth, exports of lumber and logs from Siberian USSR to Japan; and, fifth, exports of hardwood logs and, to a lesser extent, hardwood lumber and plywood from Southeast Asian Pacific countries to Japan and, in smaller quantities, to the United States and Europe.

Other significant flows of forest-product trade in the region include the export of softwood logs and lumber from New Zealand to Australia and Japan and from Chile to Japan.

Outside the region, western Europe, primarily the European Economic Community, represents an important market for a wide range of products, including newsprint, softwood lumber, and plywood from Canada and the United States, hardwood lumber and plywood from Southeast Asia-Pacific countries.

Newsprint, wood pulp, and softwood lumber account for more than 95% of the value of forest products exported to the United States from Canada. Of these products, about two-thirds of

softwood lumber exports originate from Canada's Pacific coast, i.e., British Columbia, whereas most newsprint and a large proportion of wood pulp exports are produced in central and eastern Canada.

Some restructuring of trade in these products has occurred in the past 20 years. First, the share of newsprint imports from Canada in U.S. consumption has been declining since 1960. Newsprint from new capacity in the southern U.S., based on faster-growing forests and on lower transportation costs to major U.S. markets, has displaced some imports from Canada. Second, the share of softwood lumber imports in U.S. lumber consumption has increased. Depreciation in the exchange value of the Canadian dollar since the mid-1970s has increased the competitiveness of Canadian producers.

Recurring issues in U.S.-Canada trade of forest products involve institutional conditions of market access. First, it is sometimes contended that the Merchant Marine Act of 1920, the so-called Jones Act, which requires that U.S. inter-coastal transport of commercial goods be by U.S. ships, is favourable to Canadian producers who can use lower-cost shipping than can their U.S. counterparts (Austin and Darr 1975). The Act also provides for a subsidy to U.S. producers who use U.S. carriers for shipment to offshore markets.

Much support can be given to the view that Canada-U.S. forest-products trade is largely determined by the structure of tariffs. Newsprint, lumber, and wood pulp are free of tariffs, whereas further processed products, particularly softwood plywood, are not. As a result of the recently concluded Multilateral Trade Negotiations (MTN), tariffs on softwood plywood have been retained by both countries but are to be reduced if and when a common plywood standard for North America is adopted. Only in particleboard and in some grades of printing papers are significant increases in trade expected as a result of the MTN.

Other than U.S.-Canada trade, the major trade flows in forest products in the Pacific consist of imports to Japan. In the last 20 years, Japan has increased and greatly diversified its sources of forest-products supply among countries in the region. Although Japan is expected to remain at the centre of this increasing regional interdependence, two developments will primarily influence the emerging pattern of trade. First, Japan continues to search for new sources of primary or relatively unprocessed wood products. Already it has expanded trade in logs from

the relatively untapped forests of Papua New Guinea. Second, in the face of log-export restrictions from traditional suppliers of hardwood logs, Japan could increase its imports of processed products from new sources, especially as traditional log suppliers develop processing capacity and as plywood production in Korea and Taiwan is reduced.

In 1979, Japan accounted for 71% of world imports of softwood sawlogs and veneer logs. The United States was the source for 64% of those, the USSR 28%, and New Zealand 4%. The Japan-U.S. log trade had its origins some 20 years ago when Japan became an outlet for logs salvaged from the forests of the Pacific northwest after a severe windstorm. Exports increased rapidly until the 1970s when log production in the U.S. was increasingly used for domestic demand. The Jones Act is said to encourage U.S. log exports to Japan by subsidizing use of U.S. ships for shipment to offshore markets while giving an advantage to Canadian west-coast producers by restricting intercoastal U.S. commercial traffic to U.S. ships only. Softwood log exports from the U.S. are expected to remain stable until about 1990 and then to decline primarily because of projected reductions in harvests from the U.S. west coast as industrial timberlands revert to second-growth timber (Darr 1980).

Japan imported 21×10^6 m³ of hardwood sawlogs and veneer logs in 1979 — just under 50% of world imports. Indonesia supplied 44%, Malaysia 50%, and the Philippines 4%. These countries have been the primary traditional sources of hardwood logs, primarily veneer logs to Japan, and growth of industrial roundwood exports from each of these countries was extremely high in the 1960s. In the following decade, growth rates were significantly lower, particularly in the Philippines, because of declining timber stocks. In 1975, representative trade associations established the Southeast Asian Lumber Producers' Association to stabilize the hardwood log market, to promote further domestic processing, to standardize grading, and to promote reforestation. Restrictions were placed on log exports, and the anticipated impact is a reduction in log exports and a restructuring of hardwood trade to include more processed products, particularly plywood from the traditional log-supplying countries.

The industrial impacts of reduced exports of hardwood logs from Southeast Asia are several. First, the Japanese plywood industry is totally dependent on these imports and will probably have to undergo some reduction in capacity or

other rationalization. Second, plywood industries in Korea, Taiwan, and Singapore, which have also been traditionally dependent on imported logs, will also face some contraction in output or capacity. However, Japan may not be willing to remove the 20% import duty on plywood under the General System of Preferences while its industry is undergoing contraction.

Japan is also a major importer of softwood lumber and wood pulp from Canada and the United States. A continuing issue in softwood lumber trade between North America and Japan is the complex and costly grading and inspection procedures used in Japan and the tariff on spruce-pine-fir lumber imports. These restrictions counteract the modest but important recent success attained in gaining Japanese acceptance of North American platform-frame construction techniques that use lumber sizes produced in the United States and Canada.

In 1979, New Zealand was the source of 5% of softwood sawlog imports to Japan, 6% of softwood lumber imports, 4% of pulpwood chip imports, and 12% of wood-pulp imports. Lumber and log imports were primarily whole logs or cants of radiata pine for further processing, about 70% of which were used in packing and only 20% in construction. The underlying issue has been the reluctance of Japanese authorities to accept radiata pine sawtimber for house building. This is viewed as a potentially serious constraint to the development of markets for products from the fast-growing plantation forests of New Zealand, which are predominantly stocked with radiata pine. Exports of pulpwood chips have doubled since they were started in 1970 to meet growing pulp fibre demands in Japan, to allow sawmills to recover additional revenues from processed logs, and to clear forestland for replanting. About 45% of wood-pulp production is exported, again, mainly to Japan. Large additions to capacity, particularly of mechanical pulp, are planned, and some involve joint ventures between Japanese and locally owned firms. Other forest-products trade occurs primarily with Australia, an established market for a wide range of forest products from New Zealand, protected by conditions of the New Zealand/Australian Free Trade Agreement (NAFTA). Small quantities of lumber and other wood products are exported to other Southeast Asian countries, the United States, and the Middle East.

Relatively smaller quantities of forest products, including significant volumes of hardwood products, are imported to New Zealand from Australia, which is a net importer of softwood

products, including lumber, from the Pacific northwest regions of Canada and the United States. Australian demand for softwood products is expected to be met increasingly by domestic timber plantations (de Vries 1978).

Chile is the largest net forest-product exporting country in South-Central America and, together with Brazil, accounted for 80% of export earnings of forest products from Latin America in 1979. Chilean exports of wood pulp, softwood lumber, and softwood sawlogs increased significantly between 1969 and 1979. Other exports of forest products, including paper, paperboard, and hardwood lumber were virtually unchanged. Principal markets for lumber and pulp were other South-Central American countries. Although Korea and Japan were major importers of logs from Chile, they imported relatively small quantities of its wood pulp and lumber. Raw material for the Chilean pulp-and-paper industry is mostly supplied from its radiata pine plantations while more than 50% of the domestic lumber consumption is also produced from plantation timber.

Forest-product demand has been increasing at rates exceeding world increases with the industrialization of major importing countries in the region such as Mexico, Argentina, Brazil, and Venezuela. Moreover, intraregional trade is protected by the provisions of the Latin American Free Trade area. In addition, most countries in this region have placed restrictions or regulations on exports of unprocessed logs. These and other conditions have resulted in rapid increases in regional self-sufficiency in forest products, particularly in newsprint.

Investment

In both major segments of the forest-products industries, capital expenditures in most Pacific countries increased rapidly between 1959 and 1969. Much of this growth continued until 1974 and then declined. In real terms, investment growth was probably sharply reduced after 1974, as rates of price inflation have been significantly higher since then. Even in nominal dollars, fixed-capital investment in both industry segments fell between 1974 and 1977 in Japan and New Zealand, whereas expenditures in the wood industries declined in Canada, the Philippines, and Singapore (Table 6).

The trend to reduced growth in investment in the 1970s can be attributed to five related factors. First, growth in demand for forest products has

been attenuated by the impact of rising energy prices on world economic conditions and, in turn, on major industrial markets such as housing construction, industrial packaging, printing and publishing. World industrial wood consumption increased at 1.8% annually between 1970 and 1980 compared with 3.7% a year from 1960 to 1970.

Second, forest-product prices have increased in real terms during the 1970s compared with stable-to-declining prices, as in the case of newsprint delivered to New York. Real-price increases have encouraged industrial users of some forest products to implement conservation measures or to substitute other materials, such as plastic films and cases for wrapping papers and paperboard boxes, thereby reducing demand.

Third, rising energy prices have resulted in higher manufacturing costs by adding to the delivered cost of wood, purchased fuels, and capital and indirectly by increasing labour costs by their inflationary impact on living standards.

Fourth, costs of maintenance, repair, or expansion of plant facilities in the capital-intensive pulp-and-paper industry have increased rapidly in the 1970s. The increase reflected the impact of higher price inflation on plant construction and new machinery costs but also the expanded minimum economic size of new pulp mills, mostly kraft pulp mills to produce pulps for relatively stronger paper and paperboard products. As a result, new "greenfield" investments have become scarce, and recent expenditures have been directed at modernization or expansion of existing facilities. Recent investments in new pulp capacity have been concentrated in refiner pulping, which produces paper-grade pulps requiring less wood input and a smaller capital investment per tonne of pulp than the kraft process.

Finally, availability of low-cost sources of prime-quality raw material either of temperate or tropical timber has diminished in Pacific countries and in most world regions. Rising wood costs will require substantial adjustment in the sawmill, plywood, and veneer industries where they account for a large share of manufacturing costs. Declining timber quality and additional costs of processing small timber or mixed wood will pose further adjustment problems requiring additional investment. In sawmills, recent investments have been for the installation of equipment systems for processing small-diameter timber and for increased automation, process control, and wood-chip recovery for sale to pulp mills. In wood-based panel industries, new

Table 6. Fixed-capital investment (U.S.\$ million) in forest-products industries in some Pacific-area countries.

	1959	1964	1969	1974	1977
Canada					
Paper and allied	199	294	347	562	715
Wood	55	57	140	293	233
U.S.					
Paper and allied	686	902	1419	2210	3290
Wood	301	362	461	1040	1080
Australia					
Paper and allied	18	26	52	55	78
Wood	15	22	21	66	71
New Zealand					
Paper and allied	6	8	28	94	46
Wood	5	5	10	29	16
Philippines					
Paper and allied	7	1	3	9	15
Wood	5	9	12	16	11
Singapore					
Paper and allied	na ^a	na	2	3	4
Wood	na	na	4	9	9
Japan					
Paper and allied	123	223	417	1142	845
Wood	39	103	172	367	172
Chile					
Paper and allied	na	2	3	2	na
Wood	na	1	1	2	na
Colombia					
Paper and allied	na	3	3	2	na
Wood	na	2	1	1	na
Ecuador					
Paper and allied	na	1	1	2	na
Wood	na	na	na	5	na
Mexico					
Paper and allied	14	18	31	31	na
Wood	6	1	1	5	na
Peru					
Paper and allied	na	1	15	3	na
Wood	na	3	3	5	na

^ana = not available.

Source: Various issues of the yearbooks of industrial statistics of the UN.

investments have increased rapidly in particle-board, particularly waferboard, capacity. Waferboard produced in Canada and oriented strand-board produced in the United States from wood residues or from relatively abundant but currently unused timber species have been rapidly penetrating traditional markets for the large softwood plywood industries of the Pacific northwest regions of Canada and the United States. Lower production costs of the new panelboards based primarily on cheaper raw materials favour continuation of this trend.

The impact on restructuring forest-products investment has varied among Pacific-area countries. For Canada and the United States, rising wood and energy costs have favoured increased investment in energy conservation and in refiner pulping in paper and allied industries, and recon-

stituted panelboard capacity has increased significantly.

In the Asia-Pacific region, Japan had been the leading exporter of tropical hardwood plywood, primarily to the large and growing U.S. market, in most of the post-War period. From the mid-1960s, Taiwan and Korea, aided by industrial-development policies of export promotion and by the appreciation of the Japanese currency, replaced Japan as dominant producers of tropical hardwood plywood. Until then, exports from the Philippines had also increased rapidly, with preferential access to the U.S. market provided by the Laurel-Langley agreement; these dropped because they were unsupported by export-promoting policies. Outside the region, exports to the U.K. and the entire European Economic Community expanded steadily under preferen-

tial access afforded to members of the Commonwealth and as a result of successful market promotion efforts. The traditional role of Japan, Korea, and Taiwan as intermediate processing countries for hardwood log imports from Malaysia, Indonesia, the Philippines, and more recently Papua New Guinea appears to be threatened by the decision of those countries to restrict log exports as a means to increase resource rents from log sales or to benefit from domestic processing. Investment in new or expanded capacity in the hardwood plywood industries of the former group of countries appears unlikely, and a number of problems, including removal of

domestic-market price restrictions and improved shipping and storage facilities, need to be addressed if domestic plywood industries in the latter group are to be strengthened to meet development objectives (Takeuchi 1981).

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Discussion

Kenji Takeuchi: The paper by Aird and Calow reviews the trends and issues in Pacific trade and development of forest products. In my view, these are less pressing than the issues surrounding the overall long-term demand outlook for forest products: the long-term supply of wood and the most efficient utilization of wood. On the issues of long-term supply, there will be a paper by Sedjo on plantations and other papers focusing on the supply issues to be discussed later in the conference.

However, there is one particular issue in trade that is of immediate urgency, especially from the viewpoint of tropical hardwood-producing countries — namely, the issue of local processing of timber. The issue is urgent because tropical hardwood is a semirenewable resource. The exploitation of tropical hardwood today is destructive, and, although foresters worry a great deal about destruction of tropical forests, I, as a development economist, worry more about whether the producing countries are getting the maximum possible benefit from the resources.

Recent developments in the tropical hardwood sector in the Asia-Pacific region suggest that a wholesale restructuring of tropical hardwood trade is under way with global implications. In the last few years, three major traditional suppliers, i.e., Indonesia, Malaysia, and the Philippines, which together account for more than 80% of world exports of tropical hardwood logs, have taken decisive steps to reduce log exports. The measures involve export quotas (or outright bans) and increased government charges (royalties, export taxes, etc.) on log exports. The objec-

tives of the governments are to conserve the semirenewable resources, to collect maximum resource rents from their rich forest resources, and, most importantly, to secure benefits from increased local processing of logs.

Two important features of mechanical wood processing tend to favour the location of such activities in the hardwood-producing areas. These are that the activities are relatively unskilled and labour-intensive and that they reduce the bulk of the raw material and, hence, the transportation costs.

In terms of current policies, major hardwood-producing areas in the Asia-Pacific region are broadly divided into two groups: states attempting to increase local processing of logs and export of products (Philippines, Peninsular Malaysia, Sabah, and Indonesia) and states with liberal log-export policies (Sarawak, Papua New Guinea, and other Pacific islands). Increased processing increases the export value of the logs as well as the local employment opportunities. In contrast, policies to encourage log exports reap immediate foreign exchange.

In this context, I would like to stress that a distinction must be made between two sets of objectives — those for deriving benefits from local processing and those for deriving maximum resource rents from semirenewable resources. The latter set requires careful consideration of the long-term price increases and the long-term growth of standing trees.

A government choosing between the two sets of objectives has to consider the quality of its resources, the level of its technical development,