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ELEMENTS FOR THE 1987

ANNUAL REVIEW

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1. INTRODUCTION

The International Tropical Timber Agreement states in Article 28, paragraph 2 that "the Council shall annually review and assess the world tropical timber situation and exchange views on the outlook for, and other issues closely relevant to, the world tropical timber economy, including ecological and environmental aspects". The ITTA further states that the review shall be carried out in the light of information supplied by Member countries on the performance of the forest and forest industries sector, statistical data and indicators provided by Members on areas listed in Annex C of the Agreement and of information available from organizations of the United Nations family, intergovernmental, governmental and non-governmental organizations. "The result of the review shall be included in the reports of the Council's deliberations."

This document has been compiled as a basis for discussion of the Annual Review and assessment of the tropical timber situation by the Council as required by Article 28, paragraph 2 of the ITTA. It has been prepared before regular reporting by Member countries to the Secretariat has been established. It is therefore almost entirely based on data made available by organizations of the United Nations system, especially FAO. The current information on conservation contained in the draft has been supplied mainly by environmental NGO's.

The Secretariat is in the process of establishing an information system which will be directly linked to existing data centers. A review has been made of the data which are available through other organizations and which meet the requirements of the ITTC. A survey of sources of complementary information in Member countries is now in progress and nearing completion and includes an assessment of the quality, coverage and timeliness of their data. At the same time two projects, 7.a/87 and 14/87, are being implemented to assist in obtaining data from Members through existing mechanisms

and develop new channels which may be needed. The first of these projects is scheduled for completion in 1988 and the second in 1990. The coverage and quality of background data for the Annual Review will benefit from these developments.

Before the statistical projects mentioned are completed, a periodic reporting system is planned for implementation specifically to support the Annual Review. This will entail a questionnaire to Members for their current-year estimates and short-term outlooks for major product groups, and other relevant information, which will be compiled by the Secretariat to serve as a basis for discussion by the ITTC to finalize a more comprehensive Annual Review.

The information on production, trade and forest resources that is available, though not as specific as could be desired, is almost complete for 1986. Some data for 1987 are available from various sources, but as the coverage, and sometimes the quality, is less than acceptable, they have not been included here. Comments and conclusions on production and trade suggested in this draft, therefore, refer to periods ending in December 1986. This also forms the basis for projections made.

Recent data on the development of the tropical forest resource, compatible enough to permit regional or global analyses, are not available. The only complete set of data is that published by FAO/UNEP in 1981. These data have been quoted and commented on in a large number of publications and it is therefore thought unnecessary to reproduce them again here. With regard to resource aspects this draft focuses instead on some trends in policies, research and international cooperation and on the latest developments in conservation.

The information compiled for this presentation is organized in four self-contained sections corresponding to the subject areas of the three Permanent Committees. The contents of the sections, and the corresponding Committee, are as follows:

Section 1: INTRODUCTION

Section 2: MARKET DEVELOPMENT (Economic Information and Market Intelligence)

Section 3: THE TROPICAL TIMBER INDUSTRY (Forest Industry)

Section 4: EXPORT OF TROPICAL TIMBER (Forest Industry)

Section 5: TROPICAL FOREST RESOURCES (Reforestation and Forest Management)

There is a certain amount of overlap as the subject matter fields of the three Permanent Committees merge and interact, but this has been minimized as far as possible.

2. MARKET DEVELOPMENT

2.1 Global Trends

Demand trends in consuming countries for tropical timber products can be better understood in the context of their demands for all forest products. Particularly hardwood logs, sawnwood, veneers and plywood of temperate origin are close substitutes for corresponding tropical products. Although sawn softwood has remained, in volume terms, the single most important wood product worldwide, its rate of growth has been relatively slow.

Growth in the consumption of sawn hardwoods, both temperate and tropical, has been more rapid with volumes approximately doubling over the thirty-year period from 1950 - 1980. In contrast, consumption of tropical timber worldwide doubled during the last fifteen years of this period.

Because there are broad opportunities for product substitution, the values of all forest products imported by major regions are examined in Appendix 1. In the decade 1976 - 1986, this broadly-defined market almost doubled in current-value terms though real growth has been more modest.

In 1986, consuming countries imported US$57,000 million worth of forest products. The relative size of the three market areas was very little changed during the ten years; very nearly 60 percent of all imports went to Europe and 20 percent each to North America and the Asia/Pacific countries.

2.2 Regional Trends

Appendices 2 and 3 are based primarily on the most comprehensive existing data which allow for distinguishing tropical timber imports from other industrial roundwood and sawnwood on a year-to-year, country-by-country basis over a long period of time. Because

of the geographical terms of reference of its governing body, the TIMBER data base of the Economic Commission for Europe omits the four Asia/Pacific consuming countries and Egypt except for a few highly-aggregated data series on Japan, but the Secretariat has supplemented it with recent information on Japan from national sources.

The most significant fact of the late 1970's and the 1980's has been the curtailment of growth in imports of the main tropical timber products by most countries in Europe and North America. Tropical sawnwood imports peaked in 1979 at 4.035 million m^3 for the 18 ITTO consuming countries in the ECE, and there has been a longer decline of tropical log imports from a high of 6.674 million m^3 in 1976.

It is particularly in Europe that the slackening of tropical hardwood imports is most clearly seen: tropical log imports in 1984-86 stood at 3.357 million m^3 annually, scarcely two-thirds the 1979-81 level of 5.089 million m^3. During the same period tropical sawnwood imports to Europe held up somewhat better, but still fell by 7 percent, being reduced from 3.049 million m^3 to 2.833 million m^3.

North American demand for tropical sawnwood has been sustained during the 1980's by strong growth in the United States; from 331,900 m^3 on average for 1979-81, to 499,500 m^3 in 1984-86. North America imports tropical logs in such marginal quantities that it is difficult to interpret a trend, but the ten-year period 1974-76 to 1984-86 ended with tropical log imports to this region higher than they began, at 41,800 m^3 up from 23,300 m^3.

Japan continued to take more tropical sawnwood in the 1980's, its 1984-86 imports of 784,000 m^3 annually representing a 50 percent increase over the 1979-81 level. This growth in sawnwood imports stands in sharp contrast to the decline in importation of tropical logs which registered a one-third decline and was thus very similar to development in Europe.

2.3 Competition from Temperate Timbers

At the same time that sales of tropical logs to Europe declined so sharply, European imports of temperate-zone hardwood logs rose slightly, from 3.436 million m^3 in 1979-81 to 3.484 million in 1984-86. European imports of temperate sawn hardwood weakened slightly more than tropical sawnwood imports, falling back 12 percent from 3.076 million m^3 in 1979-81 to 2.721 million m^3 in 1984-86. The picture in other regions is different. Whereas North American imports of temperate sawn hardwood declined by 13 percent, from 1.041 million m^3 in 1979-81 to 907,000 m^3 in 1984-86, North American temperate hardwood log imports rose by 23 percent from 456,000 m^3 to 561,000 m^3.

Japan's imports of hardwood logs and sawnwood of temperate origin have risen rapidly recently, even though from relatively narrow bases with respect to the total volumes of the country's wood products trade. Landings of temperate-zone hardwood logs rose 86 percent, from 242,000 m^3 in 1980 to 451,000 m^3 in 1984-86. During the same period temperate sawn hardwood increased five-fold, from 39,000 m^3 to 198,000 m^3 annually.

Market shares of tropical timber products in relation to competing products from temperate regions are displayed in Appendices 4 and 5. Percentage market shares as expressed have the merit of providing consistent information in both rising and falling market conditions. It is important to know to what extent tropical products may be simply tracking the trends and cycles affecting all forest products, and to what extent there may be signs of substitutions. In the case of tropical logs the evidence is unambiguous. Of all the countries for which comparable data are available, there was improvement only in Belgium-Luxembourg and the United States. For the aggregate of all the countries studied, the drop was from a tropical share of 85.3 percent of hardwood log imports in 1979-81, to 78.4 percent in 1984-86. On a regional basis the loss of market position was most pronounced in Europe, where the fall was from 59.7 to 49.1

percent during the same period, continuing the declining trend from 1974-1976 when tropical logs had 70.9 percent of the market share.

In the importing markets, tropical sawnwood has fared somewhat better, even posting a slight increase for the all-country aggregation, and for the first time commanding more than half the market in 1984-86, at 52.1 percent up from a 1979-81 share of 49.3 percent. Nevertheless, on a country-by-country basis performance was mixed, in that tropical sawnwood market shares in total sawn hardwood imports declined over the 1979-81 to 1984-86 period in 9 of the 16 European countries, being just offset for the region by strong performance in a few countries. For the first time recently, significant inroads were made in the Japanese import market by temperate-zone sawn hardwood, so that the tropical share came to less than four-fifths in 1984-86, though rising in absolute volumes, as noted earlier, for tropical as well as temperate sawn products.

Are the modest gains which have been posted in the volume-based market shares of tropical sawnwood sufficient, with their higher unit values, to offset the declining log trade? Since both prices and absolute volumes have been falling through the first half of the 1980's, a negative conclusion is foregone with respect to total revenues, even without applying a price index as a deflator to assess real losses. However, there is some evidence to suggest that there has also been a relative loss in the revenues accruing from international trade in tropical logs and sawnwood, vis-a-vis temperate products. Applying corresponding unit value data to the import volume series, it would appear that tropical products in 1985 captured no more than 60 percent of the revenues of the whole hardwood log and sawnwood trade; down from about 65 percent in 1980.

2.4 Policies Affecting Timber Trade

To a considerable degree the decline in trade of tropical logs is attributable to export restrictions. Many producers are currently pursuing policies of curtailing log exports, often in

conjunction with programs for increased and further domestic processing.

Consistent strategies of protection for domestic processing industries of the producing countries are evident from the fact that tariff rates for imported wood products are higher in almost all countries covered than the rates for all imported products generally, as shown in Appendix 6. The objectives of these policies are to gain the benefit of the value added. Their success will depend in part on the competitiveness of tropical hardwood products in international markets with respect to temperate-zone hardwood products, although competition from temperate softwoods is also important particularly in structural grades of sawnwood and in construction-grade plywood.

Perhaps even more important is the question of whether importers may find other sources of saw and veneer logs to replace those of tropical origin which are becoming unavailable. The saw and veneer mills which have been processing tropical logs represent substantial plant investment besides the incomes to their workers. For these reasons the comparative developments particularly in temperate-zone hardwood trade are important to a full understanding of the trends and prospects for tropical hardwoods.

It may be that these recent developments which have been discussed as trends, are in fact cyclical in nature and that a return to a more positive outlook is in the making. To set a context for exploring this issue, the next section briefly examines longer-term prospects for tropical timber and closely competing products.

2.5 Long Term Prospects for Tropical Timber Demand

2.5.1 General

Future demands for tropical timber products will depend fundamentally on development in end-use sectors, and then on the competitiveness of tropical timber with respect to other materials

which could satisfy the same end-uses. Although the price elasticities of demand for all hardwood mechanical wood products* are relatively low, there is much greater ease of substitution between tropical and temperate woods, whenever price differentials are appreciable. In the longer term there is ample leeway for changing trading arrangements, processing technologies and product lines, and for consumers to adjust to new menus of choice. Prices overall are not expected to change very dramatically for the next few years, but after 1990, increasing scarcities of tropical timber at the source are expected to exert persistent upward pressure on prices of tropical products.

A range of forecasts reviewed anticipate worldwide consumption of all sawn hardwoods to grow at rates of between 1.1 and 2.5 percent per year over the period from 1985 to 2000 with plywood growth rates (when specified separately) tending to be slightly less. Even the most optimistic of these forecasts call for future growth rates in demand for all hardwood products to be no higher than those experienced so far in the 1980's, discussed in Sections 2.1 and 2.2 above, and very unlikely to return to the growth rates seen in the 1970's.

The most important end uses of sawn tropical hardwood and panel products in major importing markets are non-structural use in construction, including building joinery and furniture. Some tropical timber is also used in heavy structures and in marine construction, the latter taking advantage of the well-known decay resistance of some tropical hardwoods. Within the domestic markets of developing countries, construction takes the largest share of sawn tropical hardwood.

In 1980, when comprehensive end-use data were most recently collected for Europe, roughly a third of sawn hardwood was used for construction, a third for furniture and a third for other uses, mostly packaging. In the United States, the fraction of sawn hardwood going

*Comprising sawnwood, veneer, plywood and blockboard.

to furniture is about the same at one third, but construction takes only half as much and the largest single usage, over 40 percent is for packaging consisting mainly of pallets and crates.

Plywood of tropical origin, which is mainly hardwood, is heavily concentrated in construction both in Europe and the United States, 40 percent in the former and fully 65 percent in the latter. Furniture is the second main end-use for plywood, about 30 percent in Europe and not quite 15 percent in the United States. A large proportion of the tropical hardwood imported to Japan, 81 percent in 1986, goes into plywood, for which the most important end-use is in construction.

Accordingly when methods of forecasting demands for mechanical wood products are pressed beyond the rudimentary level of estimating and applying elasticities with respect to GDP or population, the most obvious next candidate to include is information on the construction sector. For sawn softwood, which is outside the scope of the ITTA but still worldwide the largest single wood product category, about 70 percent of the consumption worldwide is for construction.

Certain foreseen developments in softwood supply may also have strong impacts on the market prospects for tropical hardwoods. For example, for some time an eastward shift has been under way in the center of gravity of the forest products industries in the Soviet Union as forest reserves west of the Urals are reduced. Development of the extensive Siberian forests faces formidable obstacles of climate and terrain, and of distance from the present industrial and population centers of the Soviet Union. This last factor indicates that as transport distances to Europe lengthen, it would be increasingly attractive to seek new Pacific outlets and expand trade with Asian consumers. Increasing competition from this source can be expected for tropical timber products in the utility-grade markets of Japan, China and the Republic of Korea.

2.5.2 Housing

In Western Europe, after more than two decades of very strong new building activity, since 1973 construction work has shifted more to renovation and replacement, with total housing starts gradually declining. Housing construction has continued to be more vigorous in the USSR, North America and the Asian consuming countries.

In many countries there have been subsidy and incentive programs for housing construction, and an external factor of considerable importance until about 1980 was the rate and structure of inflation. Prices of property tended to rise faster than the general price level, and their rate of increase remained for some time considerably higher than the rate of interest accruing on housing loans. A significant speculative motive for new building was present during this period in many areas.

Looking to the future, many of the factors which imparted special impetus to construction rates in the past, may no longer be so strongly operative. Projected rates of population growth to the turn of the century are much smaller than recent historical rates particularly for Europe and North America, although changes in the age structure of the population as well as in social customs are likely to lead to larger numbers of independent households for a given total population size. The general inflation rates have fallen in the 1980's so as to remove much of the speculative motive for construction, and at the same time building costs have risen in relative terms. Future development in these variables is far more difficult to foresee than the demographic evolution.

At one extreme, the rate of investment in housing might remain roughly at present levels in total, being directed largely into replacement, renovation and maintenance work. More optimistic outlooks would require at least some of the effective cost factors to evolve more favorably either autonomously or as a result of open-handed government subsidy policies.

It does seem that on a five to ten year time horizon at least, more rapid rates of construction should continue in those countries where housing space per family is still relatively low. In Western Europe and North America, there might be further impetus to building of second and vacation homes, as well as replacement of housing constructed rapidly in the immediate postwar period.

Considering the demand for forest products generally and for tropical timber in particular, in North America a high proportion of dwellings have always been single-family houses or small apartment blocks of wood-frame construction even if they had an exterior masonry cladding. The same has been true historically for the Nordic countries, and by the late 1970's and early 80's, there was a reversal of their trends in recent decades toward large-scale housing projects constructed of other materials.

In Japan the number of wooden housing units has been declining steadily as a proportion of total new housing construction, from 65.2 percent in 1976 to 44.3 percent in 1986, representing 741,552 of the total 1,674,300 units built in the more recent year. But examining only the number of units would be misleading. The typical new wooden housing unit in 1986 had 97.6 m^2 of floor area, more than half again larger than the average 64.5 m^2 for new non-wooden units. Because of this the floor area of new wooden construction in 1986, at 72,374 million m^2 was actually substantially higher than the 60,154 milliom m^2 recorded for non-wooden housing that year. The margin in terms of cube-surface area, most relevant to the demand for structural components, would be still greater for traditional wooden housing units. These are almost all fully-enclosed single dwelling units, whereas in the multi-unit housing typical of non-wooden construction, a high proportion of the wall, floor and ceiling areas are shared by adjacent units.

Even non-wood housing construction consumes substantial amounts of plywood as well as sawnwood for concrete forms, scaffolding and the like. At the high-value end of the market, all types of

housing alike make use of wood for doors, windows, other joinery and mouldings for which tropical timber has recently been popular.

2.5.3 Furniture

There is a close relationship between housing unit completions and purchases of furniture; overall the second most important tropical hardwood end-use particularly in value terms. Changing fashions contribute to volatility of wood demands for furniture. Young householders may tend to purchase inexpensive items in current fashion with the intention of relatively early replacement. Often non-wood materials are chosen, but when the furniture is made of wood, the resulting tendency is toward a higher turnover of lesser-valued species.

On the other hand, the older and established households which are becoming relatively more numerous are more likely to favor furniture solidly built from high-valued temperate-zone species. In response to these consumer preferences, similar trade names are often applied to tropical species which are entirely different botanically and do not always bear very close resemblance to their namesakes in color, grain, density and other tangible characteristics.

2.6 Short Term Prospects for Tropical Timber Demand

2.6.1 General

The 1987 estimates and 1988 forecasts for the European and North American countries arrayed in Appendices 7 and 8 are prepared annually by the ECE Timber Committee. Firstly, a tentative Secretariat forecast is based on questionnaire responses, then circulated to invite national comments before being hammered out in open discussion at the Committee's annual Session.

The forecast for Japan is prepared through an internal consultative mechanism among government, industry and trade

representatives very similar to the process described above. The 1988 table entry here is to be treated as an approximation, being extended from the forecast for the first three quarters of 1988 to obtain an estimate for the entire year, simply on the basis of recent quarterly cyclical relationships.

It is to be noted also that although the ECE Timber Committee's forecasts have a very good record of accuracy concerning the whole timber sector including domestic production as well as international trade, the entries for tropical timber presented here are in many cases not central to the concerns of the participants. Besides the simple advantage of obtaining the forecast information at first hand, the interest of greater precision would be served by bringing such a consultative forecasting mechanism into the forum for tropical timber specialists provided by the ITTC.

2.6.2 Logs

On a country-by-country basis the tropical log import outlook appears almost evenly divided among the European countries, between those expecting 1988 landings to finish higher than in 1986, and those expecting to receive less. Two countries, Austria and Sweden, have unchanged short-term prospects. But among the countries expecting shortfalls in tropical logs are some of the largest importers: France, the Federal Republic of Germany, Italy and Spain. Significantly, at the same time the Federal Republic of Germany continues to be the major purchaser of temperate hardwood veneer and logs, importing US$25.3 million worth of hardwood logs from the United States alone during the first three quarters of 1987.

The prospect for all of Europe including the USSR, is for a further decline of about 11 percent in tropical log imports from the 1986 levels, estimated at 3.3 million m^3 for 1988 compared to 3.7 million m^3 two years earlier. Japan's tropical log imports should be something more than 11.5 million m^3 in 1988, down from the 12.1 million m^3 in 1986 and 13.2 million m^3 recorded in 1987.

2.6.3 Sawnwood and Other Products

Prospects for tropical sawnwood imports are brighter, only the United States predicting a decline in imports for 1988. Nine European countries expect to get more tropical sawnwood in 1988 than two years before, while seven anticipate receiving more or less the same amounts. The anticipated import to Japan of almost 1.2 million m^3 of tropical sawnwood in 1988 is almost twice the 1986 level. At the October 1987 ECE Timber Committee session, several countries mentioned that economic activity seems strong enough in furniture and other important end-use sectors. Significantly, among temperate hardwoods, beech is gaining ground in furniture manufacture, mainly because it is competitive in price with tropical species.

The Netherlands anticipated some growth in residential construction, particularly renovation and improvement work. Furniture-making demand for hardwoods was improving in 1987, and mention was made of temperate-zone oak competing with tropical hardwoods in this sector. Italian traders also expected their export markets for furniture to remain strong through 1987. Promotion of prefabricated buildings in Italy could increase wood consumption, in an industry which otherwise has a strong tradition of masonry construction. Similarly, timber frame housing construction is also being introduced in Spain. Beginning in 1986 there has been a strong surge in Spain's imports of both logs and sawnwood, led by a general economic expansion including the furniture and construction sectors. Plywood is relatively less in demand.

In the United Kingdom, new government funding for housing was expected to continue a 1986 upturn in housing construction, restoring the demand for utility-grade timbers. High-value species continued to find an outlet in furniture manufacture. The short-term outlook was less bright in France largely because construction activity remained slack in 1986 and showed little prospect of immediate recovery, while there was still an exceptional supply of domestically produced

roundwood to be absorbed because of the salvage of storm and frost damaged stands.

Exports of roundwood from the Federal Republic of Germany in 1985-1986 were higher than imports, again due to salvage harvesting of severely storm damaged stands. More normal trade patterns can be expected in 1987. Among hardwoods, beech is exported to other European countries. Imports of tropical hardwoods generally appeared to be losing market shares due to rising prices, and although the high-value market for decorative woods remained firm overall, temperate-zone hardwoods were becoming increasingly competitive.

Domestic markets in Egypt for wood products are growing. Low priority is however accorded to wood product imports in foreign exchange allocation. Coniferous sawnwood accounts for some 85 percent of all wood products consumed in Egypt. Sawn hardwood is mostly of temperate origin except for azobe railway sleepers, but Asian tropical plywood competes with northern European supplies.

In the Republic of Korea, vigorous manufactures of furniture and musical instruments for export generate strong demand for high-value hardwood which until recently have been almost wholly satisfied by Asian tropical imports, but rising prices for hardwood from the region have led to more frequent choice of temperate-zone hardwoods as substitutes. Similarly, robust developments were reported from the Province of Taiwan, where 1986 sawn hardwood imports had already increased 32 percent over 1985 levels, led by a 60 percent rise in the country's furniture exports since the previous year. In China, limited domestic wood supplies have led to government policies to substitute other materials for wood in almost all end uses. Nevertheless overall consumption of wood is still growing at more than 7.5 percent annually. Limited availability of foreign exchange, and higher prices have restrained imports, but China still purchases about 0.5 million m^3 of Asian tropical plywood.

2.7 Market Conditions and Demand Determinants

2.7.1 Construction Activities

Housing construction rates are calculated as indices in Appendix 9 because the published information is not in every case strictly comparable from country to country. In most cases, number of dwelling units constructed was the original measure reported, but for a few countries only cubic meters or square meters of housing space were available. There are some differences also among countries with respect to the stage of construction represented. Some entries are based on housing starts, whereas in other cases they represent completions.

Not only in the aggregate for Western Europe, but also in every individual country of the region except Finland, the pace of housing construction fell substantially from 1980 to 1985, but in 1986 there were signs of an upturn in four countries including the two largest importers of tropical sawn hardwoods, the Netherlands and the United Kingdom. The scattering of additional observations available for July and August of 1987 give evidence of at least short-term recoveries beginning in the construction sectors of some other countries. In the Soviet Union, there is an apparent substantial reduction in the 1986 level of building after strong performance through 1985, but this phenomenon may well be largely due to the cycle of completing activities which affects many sectors at the end of the five-year plan period. In the United States, the rising trend in construction continued without interruption through 1986, though there were signs of slackening by late summer of 1987.

In Asia and the Pacific, housing construction continued to grow during the early 1980's and except in Australia, the trend remained unbroken through 1986. In Japan, the total number of houses built in 1986 was 1.4 million, surpassed only by the 1.487 million units built in the peak year of 1979. The near-term outlook is for the number of houses built for sale to decrease, but this is expected to be

more than offset by a substantial increase in rental housing, and to a lesser extent by increasing construction of owner-occupied housing. Land remains the most significant limiting factor. In 1985 only 10,200 ha of building lots were on the market, having fallen sharply during the 1970's from a high of 23,400 ha in 1972 and continuing in a slower decline through the early 1980's. Finance has been much more freely available; in 1986 the total value of real estate loans outstanding nationwide was twice what it had been in 1981. Housing construction in January-February 1988 in Japan was 18 percent higher than the corresponding period of the previous year on a unit basis, and 20 percent higher on a floor-area basis.

2.7.2 Prices and Interest Rates

Other things being equal, interest rate developments should provide a leading indicator of investment activity to follow somewhat later. Such analysis is complex and no pretense is made of having come to quantitative conclusions. Nevertheless, following in Appendix 10 the indicator rates available for the majority of countries through August of 1987, it can be said that there are few signs of discouragement here for the investment climate. Of all the countries represented, only in Spain is there appreciable increase even in nominal interest rates from 1986 to 1987. In every other case, the rates remain nearly constant or decline. (Appendix 10.) It seems then that the short as well as the longer-term prospects for the end uses which tropical timber serves are reasonably good. The essential remaining question is the market position tropical timber products will be able to hold with respect to competing forest products from temperate regions, in satisfying these end-use demands.

Although unique properties of certain woods serve to differentiate the high-value market to a considerable degree, it is clear that even within this segment there are relatively few consumers who cannot be persuaded to accept reasonably similar appearing substitutes if there is sufficient price incentive. In the utility timber market, in some applications and for some customers superior

weather and pest resistance of certain tropical timbers can be exploited. But for the most part, provided that certain minimum construction standards are met, buyers are often sensitive to price differentials.

Broadly defined export unit value series for tropical timber products have been expressed in Appendix 11 as relative prices with respect to temperate-zone substitute hardwood products. Tropical logs have been differentiated according to region of origin, except that the data series available for Latin American/Caribbean logs is not shown because of the narrow volume base which it represents. At this aggregate level, a number of interacting factors contribute to the observed developments. One of the most important is differences in the species composition of the aggregates, not only between regions, but also over time. To separate this effect from the full range of conventional supply and demand determinants would call for a substantial exercise of econometric analysis, but existing data are far too fragmentary.

The most that can be said is that the available statistics do not refute the impression gained from remarks of traders and processors, that price considerations have figured significantly in the substitutions which have taken place both toward and away from tropical timber products over the last two decades. For example, relative prices of tropical logs from Asia/Pacific with respect to temperate hardwood logs have been running a good deal higher than earlier, during the 1980's when the decline in relative volumes of logs sold from the tropics has been steepest. And for some time African log prices have been high both relative to temperate zone hardwood logs and relative to Asian tropical logs. While stressing again that species differences have to be taken into account and that many other factors have brought difficulty to the maintenance of log trade, the overall price differentials have not been such as to ameliorate the situation.

On the other hand, tropical sawnwood which has fared better in holding its own and in many cases continuing to penetrate temperate

product markets at least in relative terms, has benefitted during the 1980's from relative prices vis-a-vis temperate sawn hardwood which are somewhat lower than during the latter part of the previous decade. Prices of tropical timber are not wholly under the control of producers, but looking to the future every effort which is made in securing more efficient forest management, harvesting and industrial processing will work toward preserving the attractiveness of tropical products in the marketplace, at the same time helping to reduce the pressure on reserves.

3. THE TROPICAL TIMBER INDUSTRY

3.1 Overview

The slow development and modernization of timber industries in many tropical countries have led to a situation where utilization and manufacturing for the most part remain dependant solely on high grade, larger diameter logs of relatively few species. The processing, manufacturing, utilization and marketing technologies and techniques employed by such industries are, for the most part, not geared to cope with the heterogeneity of species of the natural tropical forests. This has led to underutilization of the resource and the problem of the so called "lesser-known species". On the other hand, local markets in developing countries are not highly selective and quality-demanding and hundreds of tropical species are processed for local consumption. Appendices 12 - 16 give an idea of the diversity of hardwood species being produced or traded in selected ITTO Member countries.

The sawmilling industry of producing countries in Africa and Latin America/Caribbean consists mainly of a large number of small-scale units, often poorly equipped and designed. A large number of small sawmills is also typical of Asia/Pacific, although large export-oriented mills have developed in Indonesia, Malaysia and the Philippines. New mills are often equipped with band saws but circular saws are still being used to a large extent. Such operations are both inefficient and wasteful.

Veneer production capacity in producing countries is mostly concentrated in Brazil, Malaysia and the Philippines. Most plywood also comes from three countries, Brazil, Indonesia and Malaysia. In the 1980's the most noticeable structural change in the tropical timber economy was Indonesia's shift from log exporting to plywood manufacturing. From 21 mills that produced 624,000 m^3 in 1979, production increased to almost 6 million m^3 of plywood in 1986, manufactured in over 100 mills. Some 4.6 million m^3 were exported by Indonesia in that year, mainly to the Hong Kong, Japan, Singapore and

the United States, making Indonesia the leading world supplier of plywood. Japan remains, however, the world's largest tropical hardwood plywood manufacturer and consumer. The Japanese hardwood plywood industry, which now relies mainly on logs imported from Malaysia (Sabah and Sarawak), is facing increasing competition from Indonesia whose exports to the Japanese market exceeded 1.3 million m^3 in 1987. Japan thereby replaces USA as the world's leading market for this commodity. The development of the Japanese market is likely to lead to further expansion of hardwood plywood imports.

In spite of the fact that most tropical log exporting countries have a comparative advantage for the processing of wood into various intermediate and finished products for both local and export markets, further processing wood industries in most of these countries are developing slowly. A recent study by UNCTAD lists three main obstacles to expansion of local further processing: (1) import duties and ceiling quotas imposed by consuming countries on processed products beyond logs and sawnwood; (2) difficulties of local producers to meet required standards because of insufficient trained manpower, modern technology and equipment; and (3) lack of international marketing knowledge and absence of efficient mechanisms to identify and cope with the demands of international marketing. On the other hand, current implementation of industrial development policies in a few producing countries is likely to result in increased production and exports of builders' woodwork and furniture, particularly from the Asia/Pacific region. Moreover, some developed countries have recently taken initial steps to remove certain trade and non-trade barriers. This will increase competitiveness of producer countries and may lead to more domestic processing, stimulated by improved overseas market access.

In 1986, world production of industrial roundwood exceeded 1,500 million m^3, of which almost 1/3 was hardwood timber. Tropical timber producing countries produced 128 million m^3 of hardwood logs, or 40 percent of total world production, or 48 percent of total world hardwood saw and veneer log production. In 1985 exports of hardwood timber from tropical Africa, Asia/Pacific and Latin America/Caribbean

amounted to more than 54 million m^3 in roundwood equivalent, traded for some US$ 4,900 million.

The value share of wood products in total world commodity exports decreased from 4.6 percent in 1970 to 3.4 percent in 1984, being traded for respectively US$ 14,400 million and US$ 63,300 million. Tropical timber export by ITTO producing Member countries accounted for about 7.8 percent of total value of world forest products traded in 1970 but declined to 7.3 percent in 1986. Appendix 17 shows the role wood products played in the world export trade in 1970 and 1984.

In 1970 and 1984 developing countries exported about 30 percent of all timber products classified as wood rough, wood shaped, and veneer/plywood, as compared to approximately 60 percent for the developed market economy countries. However, within the global exports of these two groups of countries, these timber products are apparently of declining importance. In 1970 they represented 2.91 and 1.39 percent of total exports of developing countries and developed market economy countries respectively, but decreased to 1.35 and 1.03 percent in 1984. On the other hand, furniture and other non-specified wood manufactures are becoming more important for both developing and developed market economy countries, with the latter accounting for 81 and 67 percent of exports for these two groups of products, respectively in 1984.

In 1986, tropical timber producing countries in the three producing regions exported 24.9 million m^3 of hardwood logs, 7.3 million m^3 of sawn hardwood, 0.76 million m^3 of veneer sheets, and 5.7 million m^3 of plywood, valued at US$ 1,628; 1,324; 164; and 1,393 million respectively (Table 3.1). There has been an exceptional growth in export of processed products from the Asia/Pacific region which has not been equalled by the other two regions; Africa has even experienced a downward trend in sawn hardwood export, but is now back to the 1970 level.

Table 3.1

Exports of Tropical Hardwood Timber by Producing Regions - 1986

	Quantity (1000 m^3)			Value (FOB) (1000 US$)			Unit Value (US$ / m^3)			Total	
	Africa	Asia/ Pacific	Latin America/ Caribbean	Africa	Asia/ Pacific	Latin America/ Caribbean	Africa	Asia/ Pacific	Latin America/ Caribbean	Value (1000 US$)	Quantity (1000 m^3)
Saw & Veneer Logs	3,665	21,205	18	356,539	1,269,295	2,625	97	60	146	1,628,459	24,888
Sawnwood	793	5,754	726	134,093	1,010,043	179,790	169	176	248	1,323,926	7,273
Veneer	196	525	42*	47,136	73,769	43,320	240	141	1,031**	164,225	763*
Plywood	83	5,340	266	27,443	1,277,241	88,518	331	239	333	1,393,202	5,689
Total	5,541***	4,3961***	1,915***	565,211	3,630,348	314,253	103	83	164	4,509,831	51,416*

* Volume data incomplete

** Based on incomplete volume data

*** Roundwood Equivalent

Source: FAO TIMTRADE Data Base (Pre-Publication Data for 1986 Yearbook of Forest Products)

3.2 Production

3.2.1 Logs

In the period 1970-86 the world supply of saw and veneer logs of coniferous, temperate and tropical hardwoods increased respectively at 1.5, 0.75 and 2.1 percent per year. The largest production growth recorded for tropical hardwood logs is not the result of a uniform growth trend in the three producing regions. African production increased at an annual average of only 0.74% while Asia/Pacific and Latin American/ Caribbean grew at 2.55 and 3.28% respectively. Production expansion in Latin America/Caribbean was fueled mostly by internal demand, but in Asia/Pacific it resulted from both increasing internal demand and expansion of production for exports due in many cases to agri-conversion of forest lands and other development projects. The production of individual ITTO producing Member countries for the period 1968 - 1986 is reported in Appendix 18.

Tropical hardwood producing countries are increasing their share in total world production of hardwood logs as shown in Table 3.2. From 1965 to 1986, the producing countries have recorded major gains, having increased their share from 32 to 48%.

In 1984-1986 over 83 percent of tropical hardwood logs produced in developing countries came from ITTO producing Members. In this period total production of the three producing regions was nearly 24 percent higher than in 1974-1976 (Table 3.3). Production increases in Asia/Pacific and Latin America/Caribbean accounted for 88 percent of output growth, while Africa accounted for the remaining 12 percent. The corresponding shares of Africa and Asia/ Pacific in total production showed slight decreases, while Latin America/Caribbean increased from 19 to 21 percent. Over 75 percent of the total output of tropical hardwood logs comes from seven countries; Brazil, Côte d'Ivoire, India, Indonesia, Malaysia, Nigeria and Philippines.

Table 3.2

Percent Share of Tropical Timber Producing Regions
in Total World Production of Selected Timber Products

Year	Saw and Veneer Hardwood Logs			Total Sawnwood			Sawn Hardwood			Veneer			Plywood		
	Africa	Asia/ Pacific	Latin American/ Caribbean	Africa	Asia/ Pacific	Latin American/ Caribbean	Africa	Asia/ Pacific	Latin American/ Caribbean	Africa	Asia/ Pacific	Latin American/ Caribbean	Africa	Asia/ Pacific	Latin American/ Caribbean
1965	6.2	19.1	6.8	0.5	2.5	1.4	2.4	11.5	6.5	7.0	10.3	2.6	0.8	1.8	1.7
1970	7.2	26.4	8.1	0.6	2.7	1.7	2.8	11.9	7.6	7.2	5.9	3.9	0.6	3.2	2.0
1975	6.2	28.0	9.3	0.8	4.1	2.2	3.4	17.1	9.3	5.9	13.1	4.9	0.8	3.4	3.0
1980	6.6	31.3	10.7	1.1	5.5	2.8	4.5	21.8	11.1	9.6	14.7	7.9	0.9	6.4	3.6
1985	6.9	31.2	11.2	1.2	6.5	3.0	4.7	26.3	12.0	9.1	16.2	7.3	1.1	13.9	3.1
1986	6.3	30.9	10.6	1.2	6.4	3.0	4.7	26.2	12.2	9.0	15.6	7.1	1.1	15.6	3.7

Source: FAO Yearbook of Forest Products, Annual, and FAO TIMTRADE Data Base (Pre-Publication Data for 1986 Yearbook of Forest Products).

Table 3.2

Percent Share of Tropical Timber Producing Regions
in Total World Production of Selected Timber Products

Year	Saw and Veneer Hardwood Logs			Total Sawnwood			Sawn Hardwood			Veneer			Plywood		
	Africa	Asia/ Pacific	Latin American/ Caribbean	Africa	Asia/ Pacific	Latin American/ Caribbean	Africa	Asia/ Pacific	Latin American/ Caribbean	Africa	Asia/ Pacific	Latin American/ Caribbean	Africa	Asia/ Pacific	Latin American/ Caribbean
1965	6.2	19.1	6.8	0.5	2.5	1.4	2.4	11.5	6.5	7.0	10.3	2.6	0.8	1.8	1.7
1970	7.2	26.4	8.1	0.6	2.7	1.7	2.8	11.9	7.6	7.2	5.9	3.9	0.6	3.2	2.0
1975	6.2	28.0	9.3	0.8	4.1	2.2	3.4	17.1	9.3	5.9	13.1	4.9	0.8	3.4	3.0
1980	6.6	31.3	10.7	1.1	5.5	2.8	4.5	21.8	11.1	9.6	14.7	7.9	0.9	6.4	3.6
1985	6.9	31.2	11.2	1.2	6.5	3.0	4.7	26.3	12.0	9.1	16.2	7.3	1.1	13.9	3.1
1986	6.3	30.9	10.6	1.2	6.4	3.0	4.7	26.2	12.2	9.0	15.6	7.1	1.1	15.6	3.7

Source: FAO Yearbook of Forest Products, Annual, and FAO TIMTRADE Data Base (Pre-Publication Data for 1986 Yearbook of Forest Products).

Table 3.3

Production of Hardwood Saw and Veneer Logs in 1974-1976 and 1984-1986

(thousand m^3 per period)

	1974-1976	1984-1986
Africa	42,737	51,250
Asia/Pacific	207,084	250,717
Latin America/Caribbean	59,528	79,586
Total	309,349	381,553

Source: FAO Yearbook of Forest Products, Annual, and FAO TIMTRADE Data Base (Pre-Publication Data for 1986 Yearbook of Forest Products).

The increase in the production of saw and veneer logs in the Asia/Pacific region comes mainly from Indonesia and Malaysia, and to a lesser extent from India and Papua New Guinea. Production in the Philippines and Thailand, on the other hand, shows downward trends due to resource depletion and changes in land use and forest exploitation policies. Thailand and more recently India are importing tropical hardwood logs, in limited amounts, to supplement local supplies for domestic industries.

3.2.2 Sawnwood

During the period 1984 - 1986 over 310 million m^3 of tropical hardwood logs were processed in the producing countries. Table 3.4 shows that the production of sawn hardwood in the three producing regions increased from 92 million m^3 in 1974 - 1976 to 154 million m^3 in 1984 - 1986. Almost the entire expansion was achieved in Brazil, India, Indonesia, Malaysia and Nigeria. A particularly large increase in sawnwood production was recorded in the Asia/Pacific region.

Among the 18 ITTO producing Member countries, half reportedly had lower sawnwood production in 1984 - 1986 than in 1974 - 1976. These were Bolivia, Ghana, Honduras, Liberia, Papua New Guinea, Peru, Philippines, Thailand and Trinidad and Tobago. Increases in production in Brazil, India, Indonesia and Malaysia accounted for over 90 percent of the total growth in producing Member countries. Hardwood sawnwood production by country from 1968 - 1986 are presented in Appendix 18.

Table 3.4

Production of Hardwood Sawn in Tropical Timber Producing Countries in 1974 - 1976 and 1984 - 1986
(thousand m^3 per period)

	1974 - 1976	1984 - 1986
Africa	9,711	15,954
Asia/Pacific	54,873	98,031
Latin America/Caribbean	27,264	40,026
Total	91,848	154,011

Source: FAO Yearbook of Forest Products, Annual, and FAO TIMTRADE Data Base (Pre-Publication Data for 1986 Yearbook of Forest Products).

It is estimated that in the period 1984 - 1986 an additional volume of 20 to 30 million m^3 of tropical sawwood was produced in log importing countries, mainly in Asia; China, Hongkong, Japan, Republic of Korea and Singapore and also in Western Europe; France, Germany, Greece, Italy and Spain. Production in these countries tends to decrease as availability of tropical hardwood logs is reduced.

Appendix 19 shows the number of sawmills and installed production capacity for selected timber producing Member countries. Although recent information on sawmilling capacity is not available from most producing countries, existing data indicate that the mills operate well below capacity. Sawnwood outputs could therefore be immediately expanded in response to increased demand.

3.2.3 Veneer

Total world production of veneer[1)] sheets of coniferous and hardwood species reached 14.6 million m^3 in 1984 - 1986. Tropical timber producing countries reported for the same period a veneer production of nearly 4.4 million m^3, which is approximately 50 percent above the production level of 1974 - 1976, as can be seen in Table 3.5.

Table 3.5

Production of Veneer and Plywood in Tropical Timber Producing Countries in 1974 - 1976 and 1984 - 1986
(thousand m^3 per period)

	Veneer		Plywood		Total	
	1974-76	1984-86	1974-76	1984-86	1974-76	1984-86
Africa	780	1,329	1,047	1,551	1,827	2,880
Asia/Pacific	1,566	2,397	4,137	20,409	5,703	22,806
Latin America/ Caribbean	597	624	3,216	4,167	3,813	4,791
Total	2,943	4,350	8,400	26,127	11,343	30,477

Source: FAO Yearbook of Forest Products, Annual, and FAO TIMTRADE Data Base (Pre-Publication Data for 1986 yearbook of Forest Products)

As was the case with the sawmilling industry, four countries, Brazil, Côte d'Ivoire, Gabon and Malaysia, accounted for nearly 95 percent of the reported increase in veneer production. Malaysia alone was responsible for over 60 percent of total production growth. In addition to these main producers, Cameroon, Congo and Thailand have registered moderate increases in their veneer production in recent years. The Philippines, once the world's largest producer of tropical

1) Available statistics on veneer production do not distinguish hardwood veneer from softwood veneer nor sliced veneer from peeled veneer.

hardwood veneer sheets, has experienced a steady decline in production. Appendix 18 shows production of veneer sheets from 1968 - 1985 by individual producing Member countries.

Available data on number of veneer mills and estimated installed production capacity, as well as reported production in 1979 and 1985 are presented in Appendix 20. The figures indicate that, except for Brazil, Malaysia and the Philippines, all veneer manufacturing countries have low production capacity, each country having only one to five relatively small mills.

3.2.4 Plywood

World production of plywood[1)] reached nearly 140 million m^3 in the period 1984 - 1986. Tropical timber producing countries reported for the same three-year period a production of approximately 26.1 million m^3, indicating a growth of over 200 percent since 1974 - 1976 (Table 3.5). Tropical hardwood plywood is also manufactured on a large scale from imported, mainly tropical logs in Japan, Republic of Korea, Singapore and the Province of Taiwan. The combined plywood production by these industries in 1986 was 12.8 million m^3. The restrictions on log exports by producing countries, and expansion of their own export oriented plywood industries, combined with low demand in the first five years of the 1980's, have caused production in these countries to decline by 25 percent from 1979, the year when their production peaked.

The increase in plywood production in tropical timber producing countries came mainly from new plants in Brazil, Indonesia and Malaysia, which jointly accounted for 87 percent of the reported

1) Available statistics on plywood production do not distinguish hardwood plywood from softwood plywood; however, plywood manufacturing in ITTO producing Member countries is almost all made of tropical hardwood species.

production growth between 1974 - 1976 and 1984 - 1986. The most noticeable change in the tropical plywood industry during the 1980's was, as mentioned earlier, the enourmous development of the panel industry in Indonesia. According to reports, Indonesia plans to further increase the plywood capacity to 8 million m^3 in 1988 and 9 million m^3 in 1989. Appendices 18 and 20 show production and capacity in ITTO producing Member countries.

Indonesia's shift from log export to manufacturing and exporting plywood has also resulted in major structural changes in the trade. The established industries in Republic of Korea, Singapore and the Province of Taiwan are losing substantial shares of their markets. Another noteworthy development was the opening up of the Japanese market to plywood import from tropical timber producing countries. Japanese plywood imports from Indonesia reportedly grew from a mere 20,000 m^3 in 1984 to over 1.3 million m^3 in 1988.

Plywood production in Africa is minimal (615,000 m^3 in 1986). Only 35 percent of the region's total production in 1986 came from the six ITTO Member countries, mainly from Gabon. The data presented in Appendix 20 indicate that from 1979 - 1985 the production capacity and number of mills operating in ITTO African Members have not changed significantly.

Among ITTO Member countries in Latin America/Caribbean, Bolivia, Honduras and Trinidad and Tobago have not developed significant plywood manufacturing industries. Peru and Ecuador reported in 1985 ten and six plywood mills respectively, operating considerably below production capacities (Appendix 20). It is estimated that Brazil, which accounts for nearly half of the region's plywood production, has over 100 mills operating. Most of them are however relatively old and located in the south, far from the hardwood resources. As late as 1983, only 17 plywood mills were operating in the Brazilian Amazon region. In 1986, out of a total regional production of 1.9 million m^3, 53 percent came from ITTO Member countries, mainly from Brazil.

3.2.5 Outlook

In 1986, over 83 percent of total hardwood logs traded internationally came from ITTO producing Members, 65 percent from Malaysia (Sabah and Sarawak). Recent estimates place Sabah's remaining virgin forest areas at less than 1.2 million ha, and therefore export levels are predicted to decrease substantially within the next decade. Commercially harvestable, undisturbed forest land in Sarawak still exceeds 5 million ha and present export levels could be sustained for another 20-25 years, if no major policy changes are enforced.

Growth in the African region is hindered by high exploitation which took place throughout the past few decades, especially in the more accessible forests. In spite of prospects of increased production in the vast and still largely untapped forests of Zaire, some forecasts indicate that by the year 2000 by production in West Africa might be considerably below present levels. In some of the traditional African timber producing countries extension of forest exploitation to heretofore undisturbed forests may allow temporary production increase in the near future. In Gabon, for instance, the recent opening of the Transgabonais Railway has made forest exploitation economically viable in the forest-rich eastern parts of the country.

Production of logs in the Latin America/Caribbean region is likely to continue to grow. Most of the production comes from the Amazonian basin where large development programmes - oil prospecting and exploitation, mining and processing of iron and other minerals, road construction, dam building, etc. - contribute to increasing forest accessibility and flow of forest produce.

In the later half of the 1980's and the 1990's, Brazil may be expected to continue the rapid increase in production of hardwood logs, mainly to supply the industries in the wood-depleted southern parts of the country and to feed a growing number of new processing units being established in the Amazonian area. Brazil is also re-entering the world hardwood log market, as restrictions on log exports have been lifted for timber from areas to be cleared in connection with agricultural, mineral and cattle ranching projects, and from the large

forest areas that will be inundated for hydro-power projects. In 1987, exports from these areas exceeded 50,000 m^3 and in 1988 estimates indicate that the exports might exceed 200,000 m^3.

Paraguay was the second largest producer of hardwood logs in the Latin America/Caribbean region in 1986. The supply from Paraguay increased more than threefold in the last 10 years and exceeded 2.8 million m^3 in 1986. This high growth rate can not be maintained over the long term, as Paraguay has limited closed hardwood forests left. At current rate they may last less than 20 years.

In the period 1985 - 2000 production of hardwood logs in developing countries of Africa, Asia/Pacific and Latin America/ Caribbean is projected to grow at average annual rates of 1.7, 0.8 and 2.4 percent respectively (Appendix 21). The combined annual production growth rate for the period, estimated at 1.4 percent, is considerably lower than the 4.3 and 2.8 percent observed in 1961 - 1984 and 1970 - 1984 respectively. If the growing demand, as observed in 86 - 87, results in increased prices, production may increase faster in Papua New Guinea, Zaire and the Amazon area, where higher logging costs and long distances to markets are major constraints currently.

Rubberwood is the only plantation species that might, in the near future, contribute significantly to the supply of tropical hardwood logs. South East Asia has some 5 million ha of rubber plantations which, at current annual rate of replanting and a conservative estimate of 150 m^3 of standing timber per ha, will yield some 22 million m^3 of rubber wood annually . At present, only a fraction of this potential volume is being utilized in the wood processing industry. Malaysia, which converts some 40,000 m^3 of rubber wood annually, exported rubber wood products valued at more than US$ 22 million in 1986.

4. EXPORTS OF TROPICAL TIMBER

4.1 General

Tropical timber products will continue to be important export items in many tropical countries. In the first half of the 1980's the world recession and the consequent lower demand in the developed countries have reduced the value and the quantity of hardwood exports from developing countries by 34 and 12 percent respectively. The demand in importing countries increased in 1987 and seems to have returned to levels close to the peak years of 1979 and 1980.

However, exports of tropical hardwood saw and veneer logs from the Asia/Pacific and Africa regions are likely to continue to decline because major suppliers are implementing policies of local processing to maximize benefits, and of restricting logging to conserve forest resources. Export of logs from Latin America/Caribbean, on the other hand, will increase in the near future, though the supply from that region is not likely to be substantial.

Efforts by producing countries to compensate for the decline in log exports by increasing exports of processed products face considerable constraints. In addition to the difficulties of establishing viable industries, producing countries are often confronted with market barriers, adopted by several importing countries, to enable their industries to remain in operation. These barriers take the usual form of import quotas and tariff rates that increase with the degree of processing. Growth in exports of tropical hardwood products is further affected by increasing competition from temperate wood products as discussed earlier.

4.2 Logs

In 1984-1986 total hardwood log export from ITTO producing Members decreased by 35 percent compared to export volumes registered in 1974-1976. Most of the export reduction took place in Côte d'Ivoire, Ghana, Indonesia and the Philippines; in the first three mainly due to production and/or market constraints and in the latter

because of policies to phase out log exports and develop local processing. Appendix 21 gives data on export of hardwood logs by ITTO producing Member countries from 1974 - 1986.

Availability of export saw and veneer logs from Sabah will continue to decrease. Sarawak has the potential to expand log exports but is more likely to maintain present export levels through the rest of the decade. In the medium and long range it is possible that the timber industry will expand in Sarawak and demand that logs are reserved for local processing. Growing concerns of conservationists to logging, may reduce the amount of logs available for export generally.

In the Philippines log export ceased as a result of the log ban, that took effect on August 28, 1987. This trade has had a downward trend since 1974 but the ban will not greatly affect the world supply, though it will affect the 15 - 20 percent contribution of log exports to the Philippines estimated at US$ 207 million in 1986.

In Papua New Guinea a policy change in 1979 resulted in a considerable increase in log export. A policy revision proposed in 1984, although introducing measures emphasizing forest resource management, community development and environmental protection, is not expected to hinder the expansion of log exports. At the end of 1985, timber concessions totalled 3.12 million ha out of an estimated total operable forest area of 15 million ha. About 8 million ha of this total area are accessible for immediate development, with a potential total supply estimated at 400-500 million m^3 of commercial timber. However, this supply consists of species different from the well known dipterocarp forests of Indonesia and Malaysia. Industries in importing countries may need to adjust to this new raw material if log export from Papua New Guinea is to compensate for the shortfall from traditional supply areas.

4.3 Sawnwood

The graphic presentations in Figures 1, 2 and 3 clearly demonstrate that declining export of tropical logs has not been offset

by corresponding increases in export of processed products from producing countries. In Africa and Latin America/Caribbean, sawnwood export shows an erratic trend and industries seem to have stagnated, with the possible exception of Côte d'Ivoire and Paraguay where significant and regular export increases were observed in the period 1974-1986 (Appendix 21). Asia/Pacific is the only producing region that has achieved a significant expansion of sawnwood export. However, the increase there comes almost exclusively from Indonesia and Malaysia. Indonesia alone accounted for 72 percent of the region's total increase in tropical sawnwood export and 66 percent of world export expansion between 1974-1976 and 1984-1986. Although producing countries could sustain similar export growth rates in the near and mid-term future, it seems likely that importing countries will be able to absorb export of sawnwood at a slower rate of expansion only in the remaining years of the 1980's and in the 1990's.

Development programmes in the Brazilian Amazon will continue to open forest areas for exploitation and are likely to result in increased export from the region, though not of the prime species, mahogany and virola. These species have been heavily exploited in the past and the remaining stands will not be able to sustain export expansion.

Within the Latin America/Caribbean region, Paraguay has become the largest single exporter of sawn hardwood. Almost all Paraguayan export goes to Southern Brazil where it is competitive viz a viz Brazilian hardwood produced in the distant Amazonian forests. Paraguay's sawn hardwood export[1)] reached 253,000 m^3 in 1986, a volume 160 percent higher than that of 1976. This export level can be sustained in the next 15-20 years, as intensive exploitation associated with agricultural development progresses.

1) In 1986 Paraguay recorded 253,000 m^3 of hardwood sawnwood export to Brazil, while Brazil reported hardwood sandwood imports totaling 424,000 m^3. Export from Paraguay was probably higher than officially reported, as some unrecorded trade takes place across the border between the two countries.

Figure 3.1 Production of Hardwood Saw and Veneer Logs and Exports of Selected Products from Tropical Timber Producing Countries in AFRICA - 1970 ~ 1986.

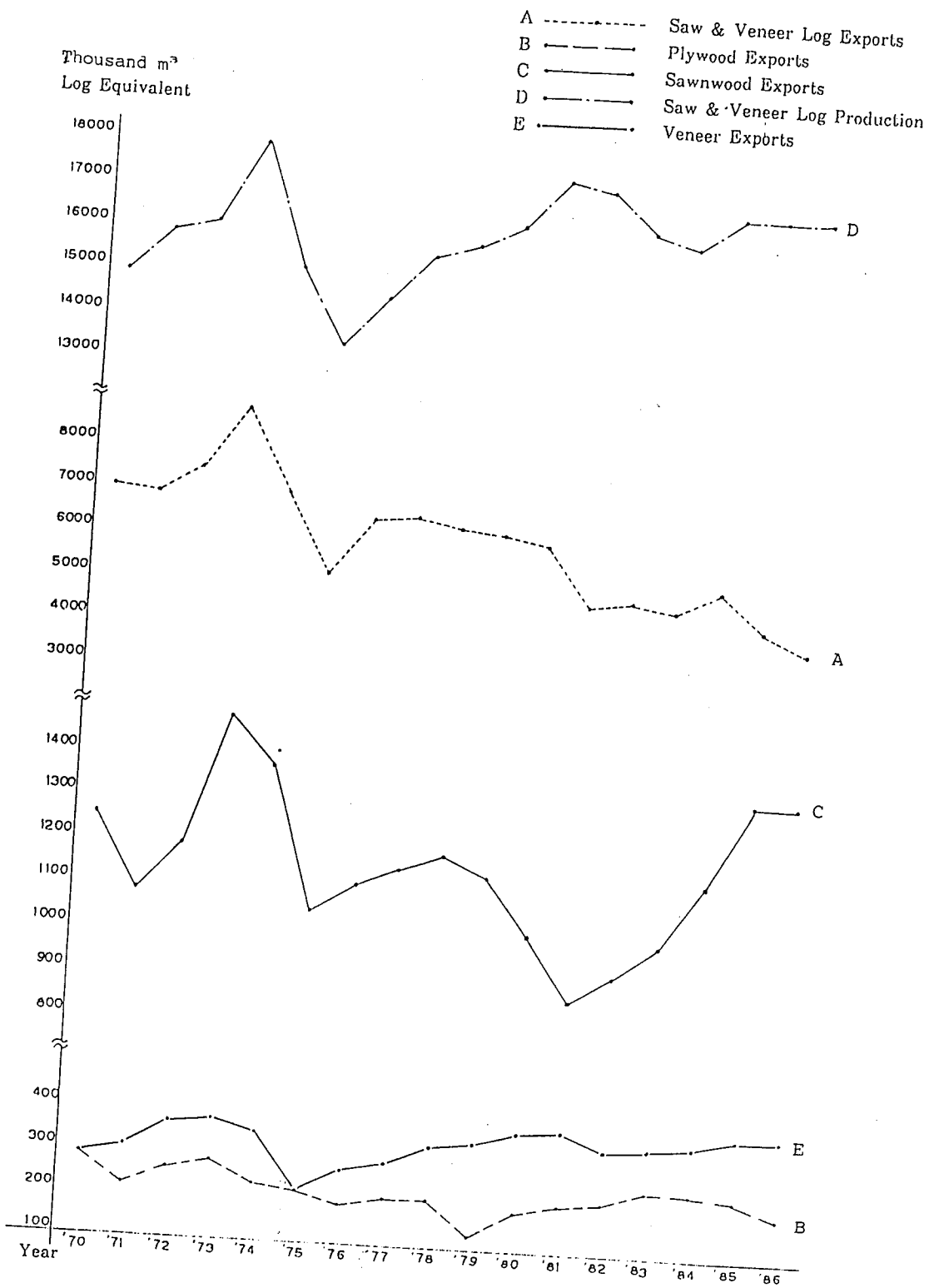


Figure 3.2 Production of Hardwood Saw and Veneer Logs and Exports of Selected Products from Tropical Timber Producing Countries in ASIA/PACIFIC - 1970 ~ 1986.

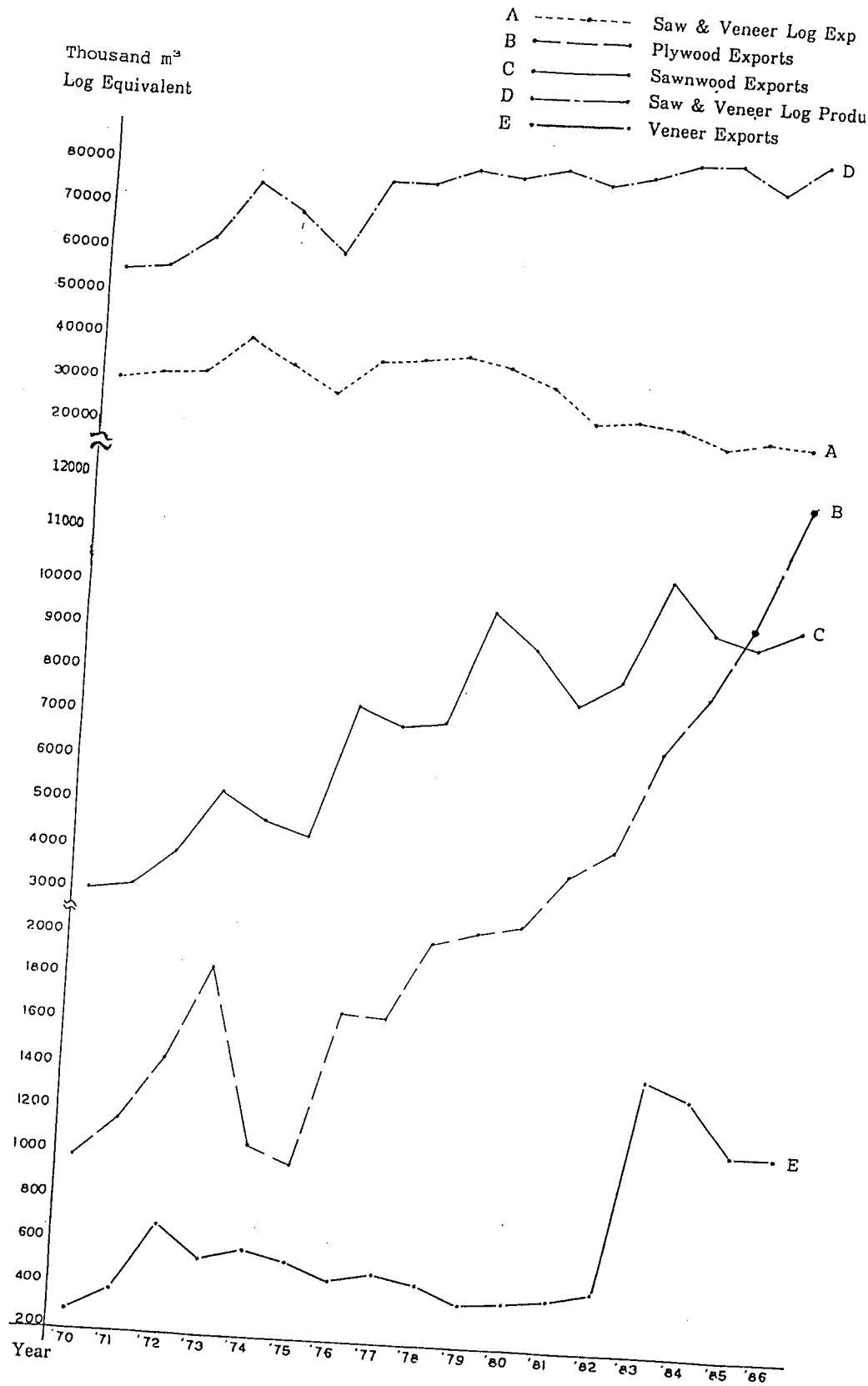
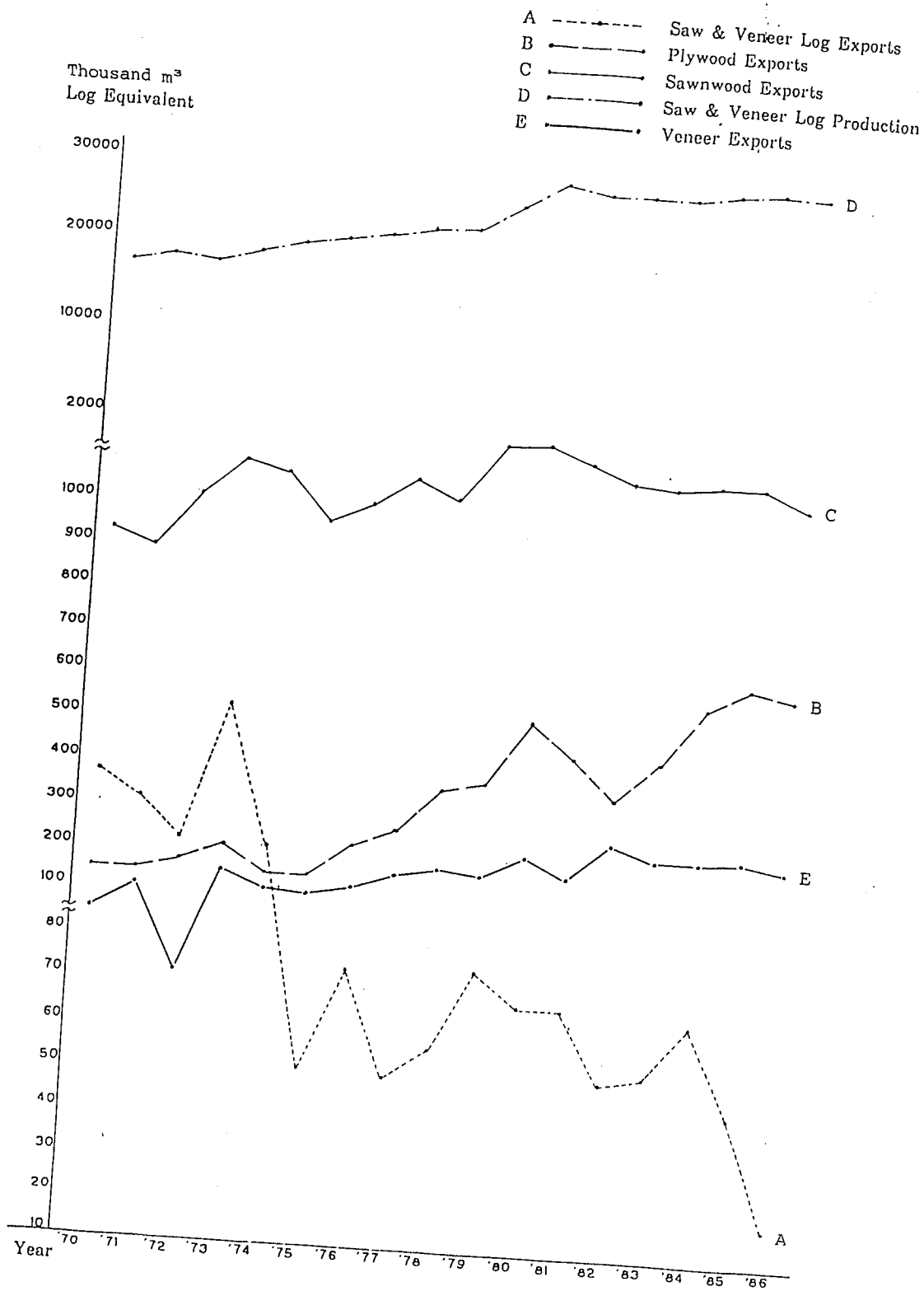


Figure 3.3 Production of Hardwood Saw and Veneer Logs and Exports of Selected Products from Tropical Timber Producing Countries in LATIN AMERICA / CARIBBEAN - 1970 ~ 1986.



4.4 Veneer

In 1984-1986, world export of veneer reached 5.6 million m^3 an expansion of more than 60 percent over the 3.5 million m^3 traded internationally in 1974-1976. The share of ITTO Member countries in world veneer exports registered a slight decrease from about 43 percent in 1974-1976 to 42 percent in 1984-1986. In this later period, two countries, Indonesia[1)] and Malaysia, accounted for over 67 percent of total veneer exports of ITTO Member countries.

Future exports of veneer from tropical producing countries are expected to expand at lower rates than observed in the past, as there is a growing trend among producers to export finished panel products rather than veneer sheets. However, a phased restructure of the tropical hardwood plywood industries in importing countries might call for a gradual phasing out of most of the veneer trade.

4.5 Plywood

In 1984-1986, world export of plywood reached 26.4 million m^3 an expansion of 57 percent over the 16.8 million m^3 traded internationally in 1974 - 1976. The share of ITTO Member countries in world plywood export experienced a sharp increase from about 13 percent in 1974-1976 to 53 percent in 1984-1986. Almost the total expansion, over 90 percent, came from Indonesia which is now the world's leading plywood exporter. Indonesia has plans to further expand plywood production, and it is likely that export will continue to increase to the Japanese and Chinese markets which are expected to be able to absorb larger volumes.

1) Indonesian exported veneer is probably produced in plywood mills as the country reports zero veneer production capacity. (See Appendix 20). A minor share of the export volume is sliced veneer.

In the 10-year period ending 1984-86, Brazil, Malaysia and Philippines also increased plywood export substantially, though in terms of global supply these three countries currently account for less than 10 percent of total world export. In the near future export from these countries will probably grow at much slower rates as there is a likelihood of over-production, beyond the absorptive capacity of international markets.

The first half of the 1980's saw a decline of the export plywood industry in, the Republic of Korea, Singapore and the Province of Taiwan. Stiff competition in the international markets and rising local costs, coupled with constraints on wood raw material supply led to a sharp decline in plywood production and exports from the Republic of Korea (Table 4.1). The plywood industries of Singapore and the Province of Taiwan, though showing a decreasing export trend, were able to retain larger shares of their markets by diversifying into the manufacture of higher grades and special plywood panels.

Table 4.1
Shares in World Exports of Plywood
(percent)

	1970	1975	1980	1985	1986
Asia/Pacific	52.8	58.4	56.80	68.0	70.4
Indonesia	0	0	3.7	42.2	47.7
Malaysia	3.2	4.3	7.2	4.2	4.7
Singapore	3.0	7.1	9.3	7.4	5.9
Republic of Korea	18.4	23.4	14.3	1.5	2.1
Province of Taiwan	13.0	14.3	13.1	6.4	5.3
Philippines	5.8	2.9	5.4	3.1	2.6
Africa	2.8	1.8	1.4	1.2	1.0
Gabon	1.4	0.9	0.6	0.5	0.5
Latin America/Caribbean	1.4	1.2	3.5	3.0	2.7
Brazil	0.6	0.6	1.5	2.7	2.3

5 TROPICAL FOREST RESOURCES

5.1 Assessment of the Resource

The global assessment of tropical forests made by FAO/UNEP in 1979-1981 still provides the best information about tropical forests. The study, which included 76 countries and covered 97 percent of all tropical forests, merged all available resource data under a standard classification scheme and referred them to a common base year, 1980. Unfortunately the study has been the subject of a large number of interpretation attempts which have created confusion and led to greatly divergent ideas with regard to the development which is taking place.

The differences in the conclusions which have been drawn from the FAO/UNEP data are mostly the result of variations in the opinion of what should be included under each forest category and biases which are given to the definitions of these categories, and utilized by different interest groups in support of their own case. Some conservationists may, for instance, regard very lightly disturbed forests as "converted" or "deforested", while industrial foresters may reserve those terms for forests which have lost 80-100 percent of their tree cover.

The 1980 assessment used the best available existing information. Some of the data were obtained from old sources and were sometimes derived by using educated guesses and assumptions with regard to trends. It contains errors resulting from incorrect classification of forests and subjective judgments where data were not available. FAO/UNEP estimated that some 40 percent of the area information was of good quality, another 40 percent of mediocre quality and the remaining 20 percent were doubtful.

More detailed, accurate and up-to-date information on tropical forests is emerging from new national studies, particularly in Africa and Asia. However differences in stratification and data

collection methods and approaches make it difficult to combine these data into meaningful regional or global appraisals.

In 1984-1987 FAO made a re-assessment of the forest resources in six Asia/Pacific countries. This re-assessment was made by the project GCP/RAS/106/JPN and included five ITTO member countries, Indonesia, Malaysia, Papua New Guinea, Philippines and Thailand. The new statistics clearly indicate that there was, and maybe still is, a confusion with regard to the definitions of the various forest categories used in the assessments. Because of this confusion it is doubtful if any specific conclusions can be drawn from the two sets of data. However, the totals may indicate that, in the five ITTO member countries, deforestation had not proceeded as rapidly as projected in 1980 and that, therefore, the net loss in total forest area was less than projected. The Philippines may be an exception from this general regional conclusion.

Besides the data for these five countries in the Asia/Pacific Region there is no compatible information with which the correctness of the trends in resource development, as projected by the 1979-1981 FAO/UNEP assessment, can be verified.

FAO intends to make a new assessment of tropical forest resources with 1990 as base year. The budget which has been requested for this exercise will probably not allow much more detailed work than was done in 1978-1980. It should therefore not be expected that much new information, with regard to the global situation, will emerge. However, the data for some countries may be more complete and the over all quality of the data might be better as improved satellite imagery information can be obtained. Some verifiable indications of trends in the development of the tropical forest resources may result. The most urgent need for new and accurate information refers to the progress of forest degradation, including the nature, extent and intensity of disturbance.

5.2 Tropical Forests as Economic Entities

The report of the Tropical Forest Resources Assessment Project focused world attention on the rapid pace of deforestation and forest depletion in the tropics and the inadequate efforts in forest regeneration and reforestation.

Approximately 1/4 of the open tropical forests have been cleared since man started to practise agriculture. The closed forests on the other hand were affected only slightly until after World War II. Since then the disturbance of these forests, in the form of commercial logging and clearance for agriculture and other land conversion, has accelerated. Some 4-5 million ha of productive closed forests are logged every year and a large portion of this total is later converted into agriculture.

The tropical forests are decreasing in area and timber content as a result of exploitation and need of land for other economic uses but also because control and management of the forests are not applied extensively and re-investment, in the form of regeneration and reforestation of disturbed and deforested areas, is inadequate. The major reason for these shortcomings is a lack of budget resources with the forest authorities. However, this lack of budget is also symptomatic of deficiencies in our understanding of the value of the tropical forests or lack of appreciation of the value of the goods and services provided by these forests.

Assessed on the production of timber alone, management of natural tropical forests does not look economically attractive. Other land use alternatives appear much more profitable. However, the tropical forests also produce a host of other products, which are traded or consumed as free goods, and many services which add value to the life of the people living in and around the forests. This is a universally accepted fact, but very little research has been done to clarify the extent, and assess the value, of this production. The realization that these additional values are produced is not sufficient

to make investment into the resource appealing to finance institutions and policy makers. It is necessary to specify the value of these goods and services and indicate who benefits from them and to what extent. Even that may not be sufficient. There is probably a need to transform the public, no-expenses consumption into real cash flows. In other words, the non-timber production must also generate revenues which can be used to cover expenses to sustain the outputs of these public goods and services. A first priority in the efforts to safeguard the retention of the tropical forests must therefore be to identify and assess the full value of all non-timber production of the natural forests, and the gains which can accrue from restoring degraded forests and reforest denuded lands.

The incomplete appreciation of the value of the forests causes decision makers to hesitate in allocating funds for investment and re-investment in this resource. As it is often assumed that time and nature will restore the forests disturbed by logging, it is not regarded necessary to allocate budget resources for post-harvest silvicultural work.

Though recent interest in plantation development has provided increased funds for plantation establishment, it is not always realized that these projects generate heavy recurrent costs, for weed control, maintenance, thinnings, etc. These costs are therefore not met, resulting in deterioration of the plantations and waste of investment funds and efforts.

The Tropical Forestry Action Plan (TFAP), which was launched in November 1985, has emerged as a major programme for development and conservation of tropical forest resources and has generated impressive commitments by tropical countries and donors for cooperation efforts to achieve sustained and diversified utilization of tropical forests.

5.3 Forest Management

The information collected by FAO/UNEP for the Tropical Forest Resources Assessment Project in 1979-1981 indicates that less than five percent of all productive, closed broadleaved tropical forests were under systematic (professional) management in 1980. If the lack of management in 95 percent of the forests also means absence of silvicultural treatment after logging, some 150 million ha of logged over forests had received no reforestation treatment to promote the sustained production of timber or to safeguard the environment. There are no indications that the situation has changed since 1980, but the untreated, logged-over areas may have increased.

Nearly a century of research into tropical silviculture has not established the economic viability of natural forest management. Early research focussed attention on and has provided substantial insight into the biological aspects of stand dynamics. However, the results which have been gained from this research have been applied in practical management to a very limited extent only. Though much remains to be researched in the complex field of tropical forest ecosystem, it is now necessary to give priority attention to the economic performance of various management systems.

Plantation forestry has been given increasing attention by governments, communities, private firms and research institutions. Over the last decade tree planting has developed into a popular movement which is gaining momentum and geographical spread.

Industrial hardwood plantations for production of logs for sawnwood and veneer production concentrate on relatively few high value species like teak and mahogany. Of the total plantation area they form a relatively small proportion, but it can be anticipated that they will grow in importance as accessible, high value timbers of the natural forests become exhausted. The bulk of log supply will in the next 20-30 years still come from natural forests, and mainly from primary natural forests.

Plantations provide better opportunities for improving the forests genetically than natural forest management, and the plantations are often established with selected, fast growing and pest resistant varieties of good form. Recent experiences, in Brazil, for instance have demonstrated big gains in yield which can be achieved by tree improvement efforts, combined with intensive soil preparation and fertilization. In some cases, production of over 100 m^3 per ha per year of Eucalyptus has been recorded compared to 1-4 m^3 for natural forests generally.

Forest management, as it is implemented in many cases, may contribute to a reduction of the genetic diversity of the forests. Repeated selective fellings of dominant trees may systematically remove desired gene resources, those giving fast growth, competitive strength, good form, etc., from the stands, causing degeneration of the forests and reduction in quality of the trees. Further, modern tree breeding uses propagation techniques which aim at isolating and retaining stable clones with desired growth performance and quality characteristics. This will need to be counteracted by conservation efforts which help to preserve the genetic diversity (gene pool) and thereby options for future breeding.

It has not been necessary, in the past, to pay attention to the risk of affecting the genetic resources by management measures, as exemplified above. As utilization of the forests intensifies and repeated cycles of the silvicultural systems are applied and plantations of selected plant materials are extended, it needs to be given increasing attention.

5.4 Shifting and Migrating Agriculture

It is estimated that non-settled agriculture is the cause of 70 percent of deforestation in Africa, 50 percent in Asia/Pacific and 35 percent in Latin America/Caribbean.

The main problem is a phenomenon which is often referred to as shifting cultivation but should more correctly be called migrating agriculture. This cultivation practice is adopted by people who are in search for employment, most likely in non-agricultural occupations, but have not found such employment and therefore try to make a living by growing food. They often have only rudimentary knowledge of farming and do not have the traditional understanding of shifting cultivation and of the need for proper rotation between fallow and crop production. They move on when soil fertility is exhausted and seldom come back to farm the same area again.

The migrating agriculture often finds its way into the forests along logging roads and the loggers often welcome this development, as it provides sources of cheap and fresh food for the logging crews. The result is that logging gets the blame for the resulting deforestation, though the real cause is not logging but a lack of employment opportunities.

The prime reasons for the people to move into the area may be many. Lack of employment is one, but such aspects as search for safety and security, hope of gaining recognition of right to the land they occupy and efforts by land developers and concessionaires to attract settlers may also play important roles.

Many countries have introduced restrictions on the expansion of traditional shifting cultivation. The result of this has often been that the fallow period is shortened to allow sufficient area to be cultivated to cater for the food needs of the expanding communities. The reduced fallow periods do not allow the soil to build up sufficient nutrient to support the normal production of agricultural products per unit area, leading to still more area needed to be cultivated and the fallow period further shortened. A point will be reached where the communities have to abandon their old cultivation areas and, even against regulations, open up new tracts, sometimes to replace completely their old, exhausted shifting cultivation areas, in order to

survive. The regulations have, in these cases, not cured the ill but made it worse.

In cases where regulations of this kind are strictly enforced, they may lead members of the shifting cultivation communities to abandon their traditional existence to search a different way of life. They may manage to find this new way of life but many of them will end up as unemployed in some urban center. They may not convert any forests, but they are not contributing to the development of their communities or the nation and their own conversion has certainly not been a happy experience.

The solution to deforestation caused by non-settled agriculture can not be found in the forestry sector alone. It must, to a large extent, come from research and development efforts in the various forms of agriculture and from creation of employment opportunities in other sectors.

5.5 Administration

Administrative control extends to a larger portion of the total forests than scientific management, that is, to more than 5 percent. This control is however, to a large extent, in the hands of authorities which have too few professional forest staff and is mainly geared toward issuing of licenses and permits to take forest produce and revenue collection rather than safeguarding the continued production of the forests or protect them from encroachment by migrating cultivators or fuel poachers. This does not mean that 95 percent of the closed, tropical forests are open to uncontrolled degradation. Legislation regulating their use is often there, but the development which is taking place indicates that the control of the use of the unmanaged forests is inefficient and to a large extent non-existent.

The lack of financial resources, for professional forest management and efficient administrative control, compounded by a

situation of high un-employment which forces people to make a living off the land, is the main cause of unplanned and damaging forest degradation and deforestation.

The insufficient budget resources for silvicultural work and control of the use of the forest has resulted in most countries delegating these tasks to those who have been given timber extraction rights. These concessionaires will, for reason of business finance, try to minimize their expenditures on silvicultural work and to optimize the outturn from their concessions, even in contradiction to concession rules and good forest management, as long as administrative control is unable to check them and, especially if they do not have a vested interest in sustaining the productivity of the resource, in the form of guaranteed long lease or full ownership of the land. In addition, they need a convenient source of fresh food for their employees working in the forests and can not be expected to seriously discourage an inflow of cultivators into their concessions.

The unclear and often split responsibility for management and control of forests and forest land is a most serious constraint on re-investment and investment into tropical forests and on sustaining their productive capacity and ability to maintain a stable and healthy environment.

5.6 Conservation

Nature conservation has expanded emphasis in later years from having been concerned mainly with reservation and preservation to include broad efforts to establish sustainable interaction between human populations and the natural resources; from being concerned at first with wildlife to include substantial programmes on preservation of plants and their genetic diversity. Conservation has developed a multi-disciplinary approach to include such aspects as sociology, economy, medicine and history in addition to ecology.

"Our Common Future", the report of the World Commission on Environment and Development, was released in April 1987. It focuses on poverty and calls for a new era of economic growth. The report points out that growth need not be environmentally destructive, but can instead generate capacity to solve environmental problems and can be made sustainable, that is achieved in a manner "which meets the needs of the present without compromising the ability of future generations to meet their own needs".

In the field of environment management and conservation two events took place in 1987 which mark the culmination of developments that had been in progress for some time and which may have wide-ranging impact on the tactics of natural resources management in the future.

A. The World Bank strengthened its policies of scrutinizing development projects with regard to their environmental impact. The Bank also institutionalized natural resources management indicating that there is a premium on conservation. Also in the regional development banks, environment impact assessments will be integrated into the work of the technical divisions.

B. In a novel approach to conservation strategy, Conservation International acquired a portion of Bolivia's discounted foreign debt and swapped this debt to the Government in return for approximately 1.5 million ha of conservation areas to be added to an already existing biosphere reserve.

- Studies of the effect of development projects on the environment has been integrated in World Bank lending programmes for nearly 20 years, but were usually carried out as part of the final review after the projects had been completed. The new approach aims at making the environment studies a part of the policy formulation process, that is integrate them in the early stages of programme identification and appraisal.

- The World Bank plans to have a total of 68 people working in environment posts and out of this number 18 will be consultants.

- The new areas added to the Beni Reserve in Bolivia will be designated to a combination of utilization and conservation in approximately the following manner:

0.6 million ha for the protection of biological resources and for the preservation of the culture of the Chiman Indians;

0.2 million ha for watershed protection;

0.6 million ha for sustainable forestry activities;

0.1 million ha as buffer zone.

- The Government of Bolivia has promised to provide US$ 250,000 for management and administration of the area.

- Task forces for forestry, watershed, socio/economic aspects, public awareness, nature conservation, environmental education, training and development of the forestry services have been established under the scheme.

- The Project will provide first aid, inoculation and health education for the local people, extension of the local schools and training programmes for forestry service and industry personnel.

A debt for nature trade similar to the debt swap involving Bolivia has been concluded between Ecuador and WWF, United States, and some other countries and NGO's are discussing further agreements with a similar approach.

Several voices doubting the value of the debt-for-conservation swaps have been raised, pointing out that they will not reduce the economic and population pressures on the land and that fresh

budget resources will continuously be needed for control and management of the areas; they do not solve the basic problems but create new ones. It is too early to draw any conclusions from these first debt-for-conservation cases. The proof of success will be that the local people continue to believe in the Reserves and that sources of finance continue to provide funds for management and administration. The wide-front approach of the Bolivian swap agreement, summarized above, indicates clearly the multi-disciplinary approach currently regarded as necessary in major conservation efforts.

The increasing disturbance of tropical forests and the conversion of land to non-forest uses may have far-reaching effects on the environment, because of the important role forests play in the carbon cycle. When forests are cleared the capacity of the world's vegetation to absorb carbon dioxide from the atmosphere is reduced. In addition the carbon immobilized in biomass and the organic component of soil is oxidized and released into the air. Continued deforestation thus results in a build up of carbon dioxide in the atmosphere which will act as an increasingly efficient ceiling preventing outflow of heat radiation from the earth. The increasing level of carbon dioxide could therefore lead to considerable changes in the earth's climate.

It is not clearly understood what the long term effects of the increased level of carbon dioxide in the atmosphere might be. Higher carbon content and increased temperature may enhance vegetation growth and thereby the ability of trees and plants to absorb carbon from the air, or the accumulation of carbon dioxide may be too rapid and result in so great climatic changes that it will have catastrophic influence on plant, animal and human life. Thus, we do not know if nature can cope with the situation or we are heading towards radical ecological changes.

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APPENDICES

Appendix 1

Value of Forest Products Import in 1976 and 1986,

(thousand U.S. Dollars)

	1976	1986
Asia/Pacific*	5,938,220	11,056,026
Europe**	18,859,898	33,691,902
North America	5,677,685	12,252,282
Total	30,475,803	57,000,210

* ITTO consuming members plus New Zealand

** Europe including U.S.S.R. and Egypt

Source: FAO TIMTRADE Data Base (pre-publication data for 1987 Yearbook of Forest Products)

Appendix 2

Average Annual Imports of Tropical Hardwood Logs,

(thousand m^3)

	74-76	79-81	84-86
Asia/Pacific			
Australia	...	...	...
China	...	...	...
Japan	...	18,960.0 *	12,900.0
Korea, Republic of	...	...	...
Subtotal	...	...	...
Europe/Mediterranean			
Austria	26.5	22.6	6.5
Belgium-Luxembourg	177.2	123.6	124.7
Denmark	40.6	14.1	12.2
Finland	0.9	0.0	0.0
France	1,511.0	5,598.7	1,120.9
Germany, Fed.Rep. of	920.3	721.7	458.5
Greece	185.3	256.6	134.6
Ireland	10.1	2.3	0.0
Italy	1,297.5	1,214.5	665.3
Netherlands	249.7	156.0	126.5
Norway	1.5	0.0	0.0
Spain	825.7	567.7	440.3
Sweden	19.3	9.8	6.0
Switzerland	68.4	65.2	24.7
United Kingdom	185.6	132.8	50.7
USSR	168.6	202.9	186.1
Egypt	...	...	...
Subtotal	5,688.2	5,088.5	3,357.0
North America			
Canada	0.0	0.0	0.1
U. S. A.	23.3	6.3	41.7
Subtotal	23.3	6.3	41.8

* 1980 only

Source: Calculations based on statistics from ECE TIMBER Data Base (published in part in ECE Timber Bulletin, various numbers).

Appendix 3

Average Annual Imports of Sawn Tropical Hardwood,

(thousand m^3)

	74-76	79-81	84-86
Asia/Pacific			
Australia	...	...	...
China	...	...	...
Japan	...	516.0 *	784.0
Korea, Republic of	...	...	...
Subtotal			
Europe/Mediterranean			
Austria	29.9	53.8	41.3
Belgium-Luxembourg	169.5	208.3	204.3
Denmark	46.4	36.8	47.2
Finland	5.9	7.4	9.7
France	363.0	521.3	367.7
Germany, Fed.Rep. of	342.7	600.7	466.4
Greece	2.3	1.2	11.2
Ireland	37.3	65.0	46.7
Italy	250.3	341.4	373.9
Netherlands	379.7	507.0	569.3
Norway	18.5	14.4	8.6
Spain	107.0	16.7	162.6
Sweden	23.8	5.7	13.3
Switzerland	17.8	31.5	8.7
United Kingdom	387.2	482.0	502.3
USSR	0.0	0.0	0.1
Egypt	...	...	...
Subtotal	2,181.3	3,049.2	2,833.3
North America			
Canada	116.0	143.6	38.6
U. S. A.	341.0	331.9	499.5
Subtotal	457.0	475.5	538.1

* 1980 only

Source: Calculations based on statistics from ECE TIMBER Data Base (published in part in ECE Timber Bulletin, various numbers).

Appendix 4

Average Percentage of Tropical Logs Relative to Total Hardwood Logs Imported

	74-76	79-81	84-86
Asia/Pacific			
Australia	...	...	...
China	...	...	...
Japan	...	98.7 *	96.6
Korea, Republic of	...	...	...
Subtotal	...	...	...
Europe/Mediterranean			
Austria	41.0	2.3	0.7
Belgium-Luxembourg	43.6	36.9	39.4
Denmark	46.5	34.3	8.6
Finland	4.2	0.0	0.0
France	83.5	95.7	94.7
Germany, Fed.Rep. of	75.0	64.7	52.7
Greece	91.1	91.3	88.1
Ireland	91.8	41.1	0.0
Italy	57.0	46.2	35.5
Netherlands	63.3	54.9	50.2
Norway	25.9	0.0	0.0
Spain	88.6	90.0	65.5
Sweden	65.4	54.1	46.5
Switzerland	43.3	39.5	19.6
United Kingdom	81.4	85.0	70.1
USSR	100.0	100.0	100.0
Egypt	...	...	...
Subtotal	70.9	59.7	49.1
North America			
Canada	0.0	0.0	0.0
U. S. A.	24.8	10.0	32.6
Subtotal	6.3	1.4	6.9

* Based on 1980 only

Source: Calculations based on statistics for ECE TIMBER Data Base (published in part in ECE Timber Bulletin, various numbers).

Appendix 5

Average Percentage of Tropical Sawnwood Imported Relative to Total Sawn Hardwood Imported

	74-76	79-81	84-86
Asia/Pacific			
Australia	...	...	...
China	...	...	...
Japan	...	92.9	79.8
Korea, Republic of	...	...	...
Subtotal	...	...	...
Europe/Mediterranean			
Austria	25.1	39.6	34.2
Belgium-Luxembourg	45.1	42.9	45.6
Denmark	55.6	51.7	43.2
Finland	28.9	30.2	41.6
France	85.0	74.4	84.9
Germany, Fed. Rep. of	61.1	66.2	60.3
Greece	3.9	0.9	29.8
Ireland	72.6	85.0	81.9
Italy	31.2	27.5	33.3
Netherlands	68.4	70.2	72.9
Norway	25.7	27.7	20.4
Spain	25.3	32.9	31.9
Sweden	27.8	19.5	18.4
Switzerland	29.9	35.9	9.3
United Kingdom	63.4	70.6	66.0
U.S.S.R.	0.0	0.0	0.1
Egypt	...	...	...
Subtotal	47.8	49.8	51.0
North America			
Canada	23.1	18.4	5.7
U.S.A.	45.6	45.1	65.2
Subtotal	36.5	31.3	37.2

Source: Calculations based on statistics from ECE TIMBER Data Base (published in part in ECE Timber Bulletin, various numbers).

Appendix 6

Comparative Rates of Tariffs on Wood Products and All Goods for Producing Countries, Trade-Weighted Averages as at Early 1987*

	Tariff Rates, percent	
	Wood Products	All Goods
Africa		
Cameroon	54.1	27.0
Congo	54.1	26.7
Côte d'Ivoire	19.0	21.5
Gabon	-	-
Ghana	30.7	29.3
Liberia	-	-
Asia/Pacific		
India	68.8	90.1
Indonesia	28.6	18.2
Malaysia	25.8	14.7
Papua New Guinea	14.9	6.3
Philippines	40.2	24.8
Thailand	22.3	26.9
Latin America/Caribbean		
Bolivia	20.0	19.5
Brazil	62.8	50.2
Ecuador	72.0	29.4
Honduras	n.a.	n.a.
Peru	74.0	39.4
Trinidad & Tobago	27.2	16.2

Source: UNCTAD Trade Information System Data Base (information as at February 1988).

Appendix 7

Import Forecasts of Tropical Hardwood Logs*

(thousand m^3)

	1986 (Actual)	1987 (Estimate)	1988 (Forecast)
Asia/Pacific			
Australia	...	...	...
China	...	...	...
Japan	12,135	13,688	11,594**
Korea, Republic of	...	...	...
Europe/Mediterranean			
Austria	6	6	6
Belgium-Luxembourg	99	75	75
Denmark	8	10	10
Finland	0	0	0
France	1,049	850	850
Germany, Fed. Rep. of	440	400	350
Greece	220	230	230
Ireland	0	0	0
Italy	514	500	450
Netherlands	133	125	120
Norway	0	0	0
Spain	443	420	400
Sweden	6	6	6
Switzerland	28	32	32
United Kingdom	43	45	45
U.S.S.R.	158	160	180
Egypt	...	...	...
North America			
Canada	...	...	...
U.S.A.	...	...	...

* Made by ECE Timber Committee in October 1987.

** Based on forecasts by Japan Forestry Agency and Japan Lumber Importers' Association

Appendix 8

Import Forecasts of Tropical Sawn Hardwood Including Boxboards*

(thousand m^3)

	1986 (Actual)	1987 (Estimate)	1988 (Forecast)
Asia/Pacific			
Australia	...	...	...
China	...	...	...
Japan	643	991	1,179**
Korea, Republic of	...	...	...
Europe/Mediterranenan			
Austria	38	38	38
Belgium-Luxembourg	231	255	255
Denmark	40	40	40
Finland	9	9	9
France	389	530	550
Germany, Fed. Rep. of	493	600	600
Greece	15	15	15
Ireland	48	48	48
Italy	379	400	400
Netherlands	707	700	775
Norway	12	14	15
Spain	198	200	200
Sweden	14	14	14
Switzerland	25	30	30
United Kingdom	570	630	640
U.S.S.R.	0	0	0
Egypt	...	...	...
North America			
Canada	...	...	...
U.S.A.	260	0	0

* Made by ECE Timber Committee in October 1987.

** Based on forecasts by Japan Forestry Agency and Japan Lumber Importers' Association.

Appendix 9

Rates of Housing Construction in Tropical Timber Consuming Countries

	Index Numbers of Monthly-Average Construction Rates, 1980=1000		1987 Percentage Change from Corresponding Period of the Previous Year	
	1985	1986		
Asia/Pacific				
Australia	1082	950		
China	1095	1043		
Japan	950	1036	+ 26	July-August
Korea, Republic of	1398	1529	+ 17	July
Europe/Mediterranean				
Austria	...	...		
Belgium	618	516		
Denmark	747	913		
Finland	1013	844		
France	673	627		
Germany, Fed.Rep.of	803	648		
Greece	650	806		
Ireland	862	816		
Italy	...	...		
Luxembourg	731	721	+121	July
Netherlands	843	887	+ 55	July
Norway	667	621	+ 28	July
Spain	729	742		
Sweden	640	560		
Switzerland*	1000	986		
United Kingdom	805	824	+ 11	July
U.S.S.R.	1238	811		
Egypt	...	...		
North America				
Canada	790	1048		
U.S.A.	1330	1385	- 11	July-August

* Index based on 1985 due to unavailable 1980 observation.

Source: ITTO Secretariat calculation using data from United Nations Monthly Bulletin of Statistics

Appendix 10

Indicative Interest Rates* in Consuming Countries

	1985	1986	1987(Aug.)
Australia	-	-	-
Austria	-	-	-
Canada (T)	9.43	8.97	8.99
China	-	-	-
Egypt	-	-	-
European Economic Community			
Belgium-Luxembourg (M)	8.27	6.64	4.82
Denmark (M)	9.97	9.09	9.34
France (M)	9.93	7.74	7.41
Germany, Federal Republic of (M)	5.19	4.57	3.78
Greece	-	-	-
Ireland (M)	11.87	12.28	9.31
Italy (M)	15.25	13.50	12.22
Netherlands (M)	6.30	5.83	4.84
Spain (M)	9.90	11.80	17.70
United Kingdom (T)	11.55	10.36	9.78
Finland	-	-	-
Japan (M)	6.46	4.79	3.19
Korea, Republic of	-	-	-
Norway (M)	12.29	14.15	-
Sweden (M)	13.85	10.15	8.46
Switzerland	3.75	3.17	2.70
United States of America (T)	7.49	5.97	6.00
Union of Soviet Socialist Republics	-	-	-

* Indicator interest rates: T - Treasury bill rates
M - Call money rates

Source: United Nations Monthly Bulletin of Statistics, December 1987.

Appendix 11

Development of Relative Export Price Ratios of Selected Tropical Timber Products in World Timber Trade (%)

	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86
Tropical African Hardwood Logs / Temperate Zone Hardwood Logs	71	64	67	66	74	80	100	113	91	90	81	72	77	110	113	88	87	83	84	89
Tropical Asian/Pacific Hardwood Logs / Temperate Zone Hardwood Logs	48	45	42	43	49	43	54	56	42	51	47	39	62	66	71	73	76	65	63	65
Tropical Asian/Pacific Hardwood Logs / Tropical African Hardwood Logs	67	70	63	65	66	54	54	52	46	57	58	55	81	60	62	84	87	78	67	65
Tropical Sawn Hardwood / Temperate Sawn Hardwood	78	81	84	78	76	62	88	70	78	84	74	72	73	72	70	67	74	79	73	70

Source: Based on unpublished statistics from FAO TIMTRADE Data Base, as at February 1988.

Appendix 12

Tropical Hardwood Species Imported into the Japanese Market, 1987 as Reported by a Major Inspecting Association

Origin	Timber Species or Group	Volume (m^3)
Malaysia		
Sabah	Red Meranti Group	407,019
	Parashorea	246,353
	Dipterocarpus	139,765
	Dryobalanops	141,608
	Yellow Meranti Group	112,649
	White Meranti Group	37,574
	Tengkawang	20,310
	Octomeles	11,069
	Palaquium	9,871
	Anisoptera	6,318
	Selangan Batu Group	5,212
	Tarrietia, Heritiera	4,450
	Hopea	2,743
	Sindora	4,005
	Durio	2,371
	Scaphium	1,467
	Canarium	2,139
	Anthocephalus	1,433
	Dyera	2,128
	Terminalia	1,372
	Duabanga	1,334
	Pentace	984
	Mangifera	1,012
Sarawak	Red Meranti Group	750,328
	Dryobalanops	245,217
	Dactylocladus	47,786
	Yellow Meranti Group	98,119
	Tengkawang	75,328
	Dipterocarpus	72,608
	White Meranti Group	58,142
	Dyera	7,110
	Alstonia	4,431
	Anisoptera	9,704
	Durio	1,653
	Palaquium	3,375
	Calophyllum	1,589
	Tarrietia, Heritiera	3,092
	Cratoxylon	1,166
	Santiria	463
	Sindora	1,122
	Hopea	1,120
	Selangan Batu Group	1,201

(continued Appendix 12)

Origin	Timber Species or Group	Volume (m^3)
Papua New Guinea	Pometia	43,672
	Palaquium	15,907
	Dillenia	12,977
	Calophyllum	11,265
	Syzygium	5,964
	Celtis	5,718
	Antiaris	5,692
	Pterocymbium	5,413
	Anisoptera	5,534
	Endospermum	4,543
	Terminalia	4,962
	Schizomeria	3,318
	Eucalyptus	5,044
	Planchonella	2,741
	Octomeles	4,433
	Canarium	2,823
	Homalium	2,346
	Canarium Red	2,607
	Azadirachta	1,476
	Ailanthus	2,251
	Pterocarpus	1,195
	Burckella	2,374
	Dracontomelon	2,196
	Campnosperma	1,625
	Buchanania	2,289
	Intsia	1,905
	Neonauclea	1,312
	Ficus	1,461
	Alstonia	1,339
	Anthocephalus	1,019
	Sterculia	818
	Hopea	1,015
Solomon Islands	Pometia	20,506
	Dillenia	6,053
	Calophyllum	7,168
	Parinari, Maranthes	3,086
	Canarium	2,695
	Syzygium	1,181
	Terminalia	1,284

Appendix 13

TROPICAL WOOD SPECIES IMPORT TRADE STATISTICS FOR LOGS 1000 M3

JANUARY - DECEMBER 1986

WOOD SPECIES	IMPORTING COUNTRIES									
	Belgium-Lu	France	Germany FR	Italy	Netherland	U.K.	Australia	Japan	Singapore	U.S.A.
AFR.MAHOGANY						7.38				1.35
AFRORMOSIA						1.90				
AZOBE	16.20				80.35					
IROKO						1.77			8.64	
KAPUR									2.15	
KERUING								33.19		
KIRI								4.68		
KWARIN								0.53		
LIGNUM VITAE					0.32					
LIMBA	3.25	0.95	19.45	9.36	0.06	5.24		10368.83	15.74	1.29
MAKORE	1.23	5.75	3.77	0.30						
MERANT.LAUAN					43.31	0.66				
OBECHE	0.06	13.17	74.52	14.23	21.04					
OKOUME	3.76	326.47	17.49	19.78	1.76	0.69				0.33
SIPO	1.69	14.78	36.02	6.57		0.73		14.67	28.40	
SWIETEN.MAH.						2.05				
TEAK						31.65		1744.48	57.45	5.03
WALNUT AFR										
OTHER SPEC.	70.83	640.42	289.53	454.27	25.63	52.08		12166.38	112.38	8.02
TOTAL	97.01	1001.54	440.78	504.51	132.47					

WOOD SPECIES - JANUARY/DECEMBER 1986

Source: FAO Monthly Bulletin - Tropical Forest Production in World Timber Trade,
FO: MISC/87/7, December 1986.

Appendix 14

TROPICAL WOOD SPECIES IMPORT TRADE STATISTICS FOR SAWNWOOD 1000 M3 JANUARY - DECEMBER 1986

WOOD SPECIES	IMPORTING COUNTRIES Belgium-Lu	France	Germany FR	Italy	Netherland	U.K.	Australia	Japan	Singapore	U.S.A.
AFR.MAHOGANY						4.09				4.62
AFRORMOSIA						3.03				
AZOBE	1.57				23.47					11.60
BALSA							4.74			
CONIFEROUS						26.41				
IROKO									8.30	
JELUTONG							6.91		21.23	
KAPUR									55.32	
KEMPAS						59.81	10.22		109.67	
KERUING								70.17		
KIRI								6.51		
KWARIN								0.02		
LIGNUM VITAE										
LIMBA	0.09	1.67	1.61	0.15	0.24					
MERANT.LAUAN	153.70				491.94	71.35	110.29	374.72	133.58	43.60
MERBAU							7.18			
NYATOH							7.40			
OBECHE						5.05				
PH. MAHOGANY							7.49			
RAMIN				238.65		39.20	7.86			
SAPELE						7.06				
SIPO	0.53	2.59	5.63	0.34	2.08	9.86				113.98
SWIETEN.MAH.						107.59				34.97
TEAK						7.62	2.85	1.78	28.22	222.03
OTHER SPEC.	75.92	381.93	493.88	141.37	0.10	74.39	66.17	366.92	385.13	
TOTAL	231.81	386.19	501.12	380.51	517.83	415.46	231.11	820.12	741.45	430.82

WOOD SPECIES - JANUARY/DECEMBER 1986

Appendix 15

List of Species and Production from a Partial Survey on Timber Industry in the Brazilian Amazon, 1982

Brazilian Commercial Name	Botanical Name	m^3	Number of Producers Surveyed
Mogno	Swietenia macrophylla	353.020	110
Cerejeira	Torresea acreana	173.317	106
Breu-Sucuruba	Trattinickia burserifolia	166.895	28
Ucuuba-Da-Varzea	Virola surinamensis	113.200	22
IPE	Tabebuia serratifolia	106.769	54
Muiratinga	Maquira sclerophylla	96.750	7
Quarubarana	Erisma uncinatum	85.780	60
Ucuuba-Da-Terra-Firme	Virola cf duckei	75.600	1
Jacareuba	Calophyllum brasiliense	72.072	21
Jatoba	Hymenaea cf courbaril	62.618	33
Cupiuba	Goupia glabra	53.313	55
Sumauma	Ceiba pentandra	49.300	9
Cedro	Cedrela odorata	48.608	67
Jatoba	Hymenaea cf palustris	41.244	9
IPE	Tabebuia cf serratifolia	35.344	63
Muiracatiara-Lisa	Astronium paraense	28.969	23
Castanheira	Bortholletia excelsa	28.368	24
Angelim-Pedra	Hymenolobium petraeum	27.513	57
Cumaru	Dipteryx odorata	26.430	58
Muiracatiara-Rajad	Astronium lecointei	26.299	38
Faveira	Parkia paraensis	25.598	19
Louro-Inhamui	Ocotea cymbarum	20.588	15
Angelim-Vermelho	Dinizia excelsa	22.511	31
Tatajuba	Bagassa guianensis	20.400	50
Jatoba	Hymenaea cf parvifolia	19.958	6
Freijo	Cordia goeldiana	17.926	42
Copaiba	Copaifera cf reticulata	16.469	16
Andiroba	Carapa guianensis	14.879	11
Angelim	Hymenolobium cf pulcherrimum	14.862	25
Cedrorana	Cedrelinga catenaeformis	13.819	23
Subtotal		1,858,149	
Other		385,201	
Total		2,243,620	

Source: IBDF, Madeiras Tropicais (Convenio IBDF/IPTI/INPA). IBDF, Ministerio da Agricultura, Brazilia, 1986.

Appendix 16

Production of Sawn Hardwood in Peru in 1986, by Species

Species	m^3
Alfaro o lagarto	4,497
Alcanfor	6,304
Achihua	690
Caoba	32,901
Catahua	45,917
Copaiba	22,742
Cedro	73,234
Congona	6,944
Cumala o sacsa	26,390
Diablo fuerte	2,854
Eucalipto	70,211
Higuerilla o palo progreso	8,420
Huayruro	3,850
Ishpingo-sandimatico	17,044
Lupuna	1,135
Matapalo	7,168
Moena o zarzafras	34,091
Nogal negro	1,256
Pashaco	3,571
Roble corriente	52,405
Roble amarillo	2,287
Tornillo o aguano	112,372
Romerillo	2,199
Ulcumano	474
Otras maderas	67,700
Total	606,565

Source: Ministerio da Agricultura. Estadistica Forestal y de FAUNA, Anuario 1986, Ministerio de Agricultura, Lima, Peru, 198

WORLD EXPORT TRADE STRUCTURE

	SITC group	WORLD				Developed market economy countries						Developing countries and territories					
		Value ($1000)		% of group total		Value ($1000)		% of group total		% of world		Value ($1000)		% of group total		% of world	
		1970	1984	1970	1984	1970	1984	1970	1984	1970	1984	1970	1984	1970	1984	1970	1984
	TOTAL	310237659	1850233324	100	100	222494327	1192093025	100	100	71.72	64.43	56851022	458753901	100	100	18.32	24.79
1	331 CRUDE PETROLEUM, ETC	15688655	214417212	5.06	11.59	794070	25892381	0.36	2.17	5.06	12.08	13977829	164524819	24.59	35.86	89.10	76.73
2	732 ROAD MOTOR VEHICLES	21945680	134621397	7.07	7.28	20527677	127301682	9.23	10.68	93.54	94.56	200043	3458910	0.35	0.75	0.91	2.57
3	719 MACHINES NES NONELECTRIC	14232740	67801783	4.59	3.66	12914176	60804807	5.80	5.10	90.74	89.68	179065	3145393	0.31	0.69	1.26	4.64
4	TOTAL WOODPRODUCTS	14420712	63308538	4.65	3.43	11315041	50159719	5.09	2.76	74.46	79.23	1951681	10095097	3.37	2.21	13.53	15.95
	243 WOOD SHAPED	2588196	10248286	0.83	0.55	1740889	7477183	0.78	0.63	67.26	72.96	442110	1741147	0.78	0.38	17.08	16.99
	242 WOOD ROUGH	1828467	4850660	0.59	0.26	660241	2005856	0.30	0.17	36.1	41.35	852980	2299225	1.50	0.50	46.5	47.40
	631 VENEERS, PLYWOOD ETC.	1101500	4921889	0.36	0.27	683499	2743033	0.31	0.23	62.05	55.73	359654	2136664	0.63	0.47	32.65	43.41
	TOTAL TIMBER	5518163	20020835	1.78	1.08	3084629	12226072	1.39	1.03	59.00	61.07	1654744	6177036	2.91	1.35	29.99	30.85
	641 PAPER AND PAPERBOARD	4448690	20504574	1.43	1.11	4329325	19281159	1.95	1.62	97.32	94.03	34297	718551	0.06	0.16	2.90	12.86
	821 FURNITURE	1362225	10304608	0.44	0.56	1013966	8371301	0.46	0.70	74.43	81.24	90081	1569333	0.16	0.34	6.61	15.23
	251 PULP AND WASTEPAPER	2601016	9082827	0.84	0.49	2474638	7979098	1.11	0.67	95.14	87.85	62047	724181	0.11	0.16	2.39	22.4
	632 WOODMANUFACTURES NES	454296	3268501	0.15	0.18	389181	2209994	0.17	0.19	85.67	67.61	62145	871188	0.11	0.19	13.68	26.55
	241 FUELWOOD AND CHARCOAL	36322	127193	0.01	0.01	23302	92095	0.01	0.01	64.15	72.41	12367	34808	0.02	0.01	34.05	27.37
	TOTAL OTHER WOOD PRODUCTS	8902549	43287703	2.87	2.35	8230412	37933647	3.70	1.73	92.45	87.63	260937	3918061	0.46	0.86	2.93	9.05
5	332 PETROLEUM PRODUCTS	8331301	92636938	2.69	5.01	3739888	38287573	1.68	3.21	44.89	41.33	3884559	39782343	6.83	8.67	46.63	42.94
6	729 ELECTRICAL MACHINERY NES	5706629	48617958	1.84	2.63	5289484	40044079	2.38	3.36	92.69	82.36	281125	8170042	2.49	1.78	4.93	16.80
7	841 CLOTHING NOT OF FUR	5615981	36655077	1.81	1.98	3874366	17011407	1.74	1.43	68.99	46.41	1434157	18933591	2.52	4.13	25.54	51.66
8	718 MACHS FOR SPCL INDUSTRYS	5039153	22919375	1.62	1.24	4265950	19749638	1.92	1.66	84.66	86.17	73921	1014646	0.13	0.22	20.61	25.03
9	724 TELECOMMUNICATIONS EQUIP	5008998	32722103	1.61	1.77	4504666	24656702	2.02	2.07	89.93	75.35	319777	7737836	0.56	1.69	6.38	23.65
10	711 POWER MACHINERY NON-ELEC	5814596	30884903	1.87	1.67	4668670	27476478	2.10	2.30	80.29	88.96	87077	2151398	0.15	0.47	1.50	6.97
11	512 ORGANIC CHEMICALS	4368511	34559326	1.41	1.87	4255110	31358944	1.91	2.63	97.40	90.74	93982	2393761	0.17	0.52	2.15	6.93
12	735 SHIPS AND BOATS	4265860	21421247	1.38	1.16	3665084	14974395	1.64	1.26	85.68	69.90	177489	5876537	0.31	1.28	4.16	27.43
13	722 ELEC PWR MACH, SWITCHGEAR	3587813	24677006	1.16	1.33	3283483	20412629	1.48	1.71	91.52	82.72	99223	3448480	0.17	0.75	2.77	13.97
14	581 PLASTIC MATERIALS ETC.	3969718	28061407	1.28	1.52	3907292	26146630	1.76	2.19	98.43	93.18	45782	1651308	0.08	0.36	1.15	5.88
15	TOTAL TIMBER	5518163	20020835	1.78	1.08	3084629	12226072	1.39	1.03	59.00	61.07	1654744	6177036	2.91	1.35	29.99	30.85
16	714 OFFICE MACHINES	4386497	39475286	1.41	2.13	4130416	35482319	1.86	2.98	94.16	89.88	100107	3613371	0.18	0.79	2.29	9.15
17	674 IRN, STL UNIV, PLATE, SHEET	5579018	18496975	1.80	1.00	2325193	11391552	1.05	0.96	91.18	87.32	99439	1879214	0.17	0.41	1.78	10.15
18	734 AIRCRAFT	4176496	25663095	1.35	1.39	4019935	23898790	1.81	2.00	96.25	93.13	46072	850425	0.08	0.19	1.10	3.31
19	861 INSTRUMENTS, APPARATUS	3403461	21632815	1.10	1.17	3274631	19945509	1.47	1.67	96.21	92.20	44595	1345513	0.08	0.29	1.31	6.22
20	667 PEARL, PREC-P STONE	2239918	10920839	0.72	0.59	1913740	9059660	0.86	0.76	85.44	82.96	325774	1860005	0.57	0.41	14.54	17.03
21	641 PAPER AND PAPERBOARD	4448690	20504574	1.43	1.11	4329325	19281159	1.95	1.62	97.32	94.03	62921	709383	0.11	0.15	1.41	3.46

Fourth position SITC group World

Third position of SITC group Developed market economy countries

Sixth position of SITC group Developed countries and territories

Source: UNCTAD, Handbook of International Trade and Development Statistics, Supplement, 1987.

Appendix 18

ITTO Producing Member Countries Production of

Hardwood Saw & Veneer Logs, Sawn Hardwood, Veneer & Plywood, 1968 - 1985

(thousand m^3)

	products	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985
Africa																			
Cameroon	Saw and Veneer Logs	640	635	750	820	819	885	1000	1000	1200	1380	1603	1627	1613	1700	1707	1776	1923	2093
	Sawnwood	92	108	120	120	112	119	200F	250F	235	258	465	361	380	383	383F	341*	552	565
	Veneer	30	30	30F	30F	50F	63F	63F	63F	63	63F	63F	63F	63F	63F	63F	63F	63F	63F
	Plywood	3	5	7F	10F	10F	10F	10F	10F	10	10	10F	10F	10F	10F	10F	10F	10F	10F
Congo	Saw and Veneer Logs	777	820	810	845	771	650	470	321	400	414	461	476	603	545	517	514	587	572
	Sawnwood	42	42	43F	44	48	58	48	56	60	49	43	53	64	73	66	66	60	50
	Veneer	60	75	67	67	91	96	71	43	55	72	78	70	75	68	63	74	63	67
	Plywood	-	-	-	-	-	-	-	-	-	1	2	2	4	3	4	5	6	5F
Côte d'Ivoire	Saw and Veneer Logs	3266	4277	3461	3883	4118	5229	4629	3960	5096	5223	4580	4980	4844	4059	4106	4088	3895	3895F
	Sawnwood	290*	307*	308	298	303*	500	512	510	583	681	665	670	664	611	748	718	646	646F
	Veneer	37*	30*	60*	64	55	53	57	25	38	43	38	49	122	108	100	127	122	122F
	Plywood	15*	15*	20*	24	29	32	33	35	55	72	65	54	63	25	24	33	26	26F
Gabon	Saw and Veneer Logs	1639	1835	1880F	2030F	2270F	2360	2087	1463	1174	1343	1295	1246	1347	1142	1135	1303	1484**	1484F
	Sawnwood	55	48	64	45	46	52	46	55	55F	88	88F	88F	88F	88F	88F	88F	97	106
	Veneer	8	5	21	35	32	40	41	41	41	45	60	101	97	97F	97F	97F	97F	97F
	Plywood	69	70	71	74	79	77	71	63	50	43	69	73	95	70	104*	104F	104F	131F
Ghana	Saw and Veneer Logs	1389	1595	1565	1446	1597	2076	1439	1332	1590	1640	1130	890	600	550	410	574F	603	794
	Sawnwood	262	365	359	340	348	370	453	398	316	520	320	280	160	160	150	210	220	302
	Veneer	-	1	1	3	5	7	18	15	14	18	19	17	22	23	21	15	24	34
	Plywood	27	25	33	41	49	53	59	40	59	47	40	38	48	63	39	39F	39F	24F
Liberia	Saw and Veneer Logs	90	211	220	319	402	524	409	464	605	775	599	756	745	451	385	344	317	317F
	Sawnwood	25	50	35F	44F	55F	68F	156	109	128	138	40	66	43	99	72	61	53	53F
	Veneer	-	-	-	-	-	-	-	-	-	-	-	2F	2F	2F	2F	2F	2F	2F
	Plywood	-	-	-	-	-	-	-	-	3F	3F	7F	15	7	2	2	3	3F	3F

(continued Appendix 18)

	products	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985
Asia/Pacific																			
India	Saw and Veneer Logs	4675	4840	5020	5200	5155F	9077F	9509F	9961F	10434F	10929F	11449	11972F	12539F	13134F	13758F	14411F	15095F	15812F
	Sawnwood	1800	1875	1950	2025	2100F	4768F	5241F	5761F	6332F	6961F	7650	8410F	9244F	10161F	11169F	12278F	13495F	14834F
	Veneer	1	2	3	3	2	2	8	9	11	19	4F	4	4F	4F	4F	4F	4F	4F
	Plywood	114	112	128	144	130	126	143	127	141	149	176	180	180F	180F	180F	180F	180F	360
Indonesia	Saw and Veneer Logs	5500	7000	10700	13705	16821	16197	23120	15800	23200	22330	26620	24860	27559*	23334*	22448*	25470*	26958*	23500
	Sawnwood	1662	1662	1662	1662	1662	1380	1819	2400	3000	3500	3500	3400	4797*	5250*	6798	6296	6600	7065
	Veneer																		
	Plywood	4	7	7	7F	4	9*	24*	107*	214*	279*	424*	624	1011*	1552*	2487	3138	3820	4615
Malaysia	Saw and Veneer Logs	16225	16940	18658	18457	20713	24044	21492	18972	26585	27579	28504	28516	28516F	26559	30317*	33000	31590*	30880*
	Sawnwood	2575	2589	3100	3098	3738	4133	4043	3851	5128	5654	5913	5913F	5913F	6173F	6444F	7138	7138F	7138F
	Veneer	23	35	36	96	163	275F	297F	321F	348F	377F	408F	442	475F	511F	549F	598	642F	642F
	Plywood	120	172	197	231	330	375	311	404	525	565	465	490	601	603	787	787F	787F	787
Papua New Guinea	Saw and Veneer Logs	342	331	436	645	794	733	809	855	1094	879	1093	1093F	1046	984	1420	1817	1817F	1817F
	Sawnwood	69	82	92	64	146	115	114	113F	123	113	113F	113F	133	78	78F	78F	78F	74*
	Veneer	3	3	3	3	3	5	5F	4F	5F	8	10	10F	10	10F	10F	10F	10F	10F
	Plywood	17	16	16	18	16	18	22	19	15	15	15	15F	10	9	9F	9F	9F	9F
Philippines	Saw and Veneer Logs	11584	11005	10680	8416	10446	10190	7332	8441	8646	7873	7169	6578	6212	5280	4462	4283	3785	4206F
	Sawnwood	1022	1466	1341	861	1412	1061	1292	1470	1609	1567	1781	1626	1529	1219	1200	1222	1080F	1200*
	Veneer	185	90	242	234	212	172	189F	99F	89	110	121	140	133	138	98	123	71	71F
	Plywood	309	338	653*	642*	732	705	274	423	416	489	490	515	553	463	434	469	414F	515
Thailand	Saw and Veneer Logs	3279	3010	2655	2725	3721F	3517F	3517F	3090	3210	3340	2609	3101	2544	1798	1769	1820	2032	1817
	Sawnwood	1435	1306	1162	1190F	1923	1923F	1500	1659	1659F	1737	1565	1550	1527	899	885	930	1016	909
	Veneer	8	9	8	8	12	13	13F	9	11	13	11	23	23	23	15	15	50	53
	Plywood	43	46	47	49F	56	55	60	51	63	68	75	93	89	106	160	165	165	170
Latin America/ Caribbean																			
Bolivia	Saw and Veneer Logs	169F	181	181*	185	174	216	331	265	265F	200	326	455	404	309	213	136	136F	136F
	Sawnwood	63	85	70	96	99	149	143	132	135	87	140	219	216	168	113	93	93F	93F
	Veneer	-	-	-	-	-	-	-	-	3	18F	16F	19F	22F	22F	22F	22F	22F	22F
	Plywood	1	2	1*	1	1	1F	2	2	2	3	1	4	6	6	1	1F	1F	1F

(Continued Appendix 18)

	products	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985
Brazil	Saw and Veneer Logs	6620	7010	7470	7790	7000	7835F	8605F	10168	10688F	11920F	12595F	13381F	14285F	14285F	14285F	14285F	14285F	14285F
	Sawnwood	3100*	3300	3500*	3600	3200	3444	3977	4659	5397	6053	6385F	6736	7738	8377	8377F	8377F	8377F	8377F
	Veneer	80	90	96*	116*	152	188	175	154	169	190*	190F	200	216	234	234F	234F	234F	234F
	Plywood	290*	300	342*	431	606	659	655	660	695	698F	722F	762	826	902	902F	902F	902F	902F
Ecuador	Saw and Veneer Logs	1160	1280	1453F	1593F	1652F	1740F	1744F	1591F	1604F	1810F	1652F	1800F	1961F	1961F	1961F	1962	2077	2350
	Sawnwood	581	640	700	766	792	833	833F	745	750	850	760	828	903	984	978	1140	1210	1213
	Veneer	-	-	-	-	-	-	-	1	3	3	2	2	2	2	3	3F	3F	3F
	Plywood	19	20	20	24	26	29	30	38	38	40	50	55	59	65	65	65F	65F	65F
Honduras	Saw and Veneer Logs	45	40	40	40	109	109F	21	43F	40	34	31	31F	30F	30F	30F	3F	3F	3F
	Sawnwood	6	10	5	21	20	8	7	18	17	12	11	8	7*	7*	2	3	3	3F
	Veneer																		
	Plywood	4	5	6	6	12	12F	11	10	11	13	14*	14*	11*	11*	5	6	8	8F
Peru	Saw and Veneer Logs	582	576	680	830	848	882	1009	1082	1635	1150F	922	1025	1367	1345	1162	1162F	1042	1116
	Sawnwood	269	266	312	380F	380	388	465	514	783	469	479	538	602	647	571	571F	472	528
	Veneer	7	11	14	11	11	12F	8F	3F	6F	24	24	28	35	38	20	20F	20F	20F
	Plywood	24	25	33	39	48	51	48	49	76	39	24	38	49	40	37	37F	37F	20
Trinidad and Tobago	Saw and Veneer Logs	68	100*	120*	110*	80F	99F	62	81F	81F	81F	60	56	73	73F	60	43	39	39F
	Sawnwood	35	50*	59	59F	35F	40	41	32F	32F	32F	32F	32	33	33F	28	22	21	21F
	Veneer																		
	Plywood																		

F: FAO Estimate.

*: Non-Official Source.

Source: FAO. Yearbook of Forest Products, FAO, Rome, 1975 - 1986.

Appendix 19

Sawnwood Production Capacity in Selected ITTO Producing Member Countries

Country	Number of Mills	Estimated Annual Production Capacity ($1000m^3$)	Annual Production ($1000m^3$)	Year
Brazil[1/]	13,000			
Amazonian Region[2/]	1,640		5,393	1980
Indonesia[3/]	3,047	16,650	6,649	1985
Malaysia[3/]	989		5,800	1984
Peninsular Malaysia[4/]	672	5,900	3,800	1986
Sabah[3/]	162			1984
Sarawak[3/]	152			1984
Papua New Guinea[3/]	49	237	49	1985
Philippines[3/]	174	4,715	924	1985
Peru[1/]	451	860	476	1978
Ecuador[5/]	490			

1/ Ponce, R.H., Estudio Sobre la Industria de la Madera y los Productos de Madera de Determinados Paises de America Latina, UNIDO, ID/WG. 380/1.1982.

2/ CPPF-INPA, Estudo da Oferta Potencial e Efetiva de Madeira da Amazonia Ocidental, Centro de Pesquiso de Produtos Florestais, Instituto Nacional de Pesquisas da Amazonia, 1982.

3/ Country Reports Presented at the Thirteenth Session of the FAO Asia-Pacific Forestry Commission, Beijing, 1987.

4/ Forest Sector Review - Jan - Dec 1986, Forest Economic Unit, Forestry Department Headquarters, Peninsular Malaysia.

5/ Direccion Nacional Forestal, Proyecto Creacion de la Corporacion de Desarrollo para el Sector Forestal y Maderero de Ecuador (cormadera), Quito, 1987.

Appendix 20

ITTO Producing Member Countries production Capacity of Veneer and Plywood (1979 and 1985)

	Veneer Sheets						Plywood					
	Number of Operating Plants		Estimated Annual Production Capacity (1000 m3)		Annual Production[1] (1000 m3)		Number of Operating Plants		Estimated Annual Production Capacity (1000 m3)		Annual Production[1] (1000 m3)	
	1979	1985	1979	1985	1979	1985	1979	1985	1979	1985	1979	1985
Africa												
Cameroon	–	–	–	–	(63) (63F)	(63) (63F)	–	–	–	–	(10) (10F)	(10) (10F)
Congo	4	4	80	65	(70) (70)	(65) (67)	1	1	2	7	(2) (2)	(7) (5F)
Cote d'Ivoire	4	–	95	–	(44) (49)	(1)(122F)	4	–	45	–	(45) (54)	(9) (26F)
Gabon	–	–	–	–	(60)(101)	(39) (97)	–	–	–	–	(39) (73)	(24) (131F)
Ghana	–	–	–	–	(14) (17)	(0) (34)	–	–	–	–	(40) (38)	(2) (24F)
Liberia	2	2	2	–	– ( )	– (2F)	2	3	20	80	(7) (15)	(60) (3F)
Asia/Pacific												
India	–	–	–	–	(4) (4)	(4) (4F)	–	–	–	–	(180)(180)	(360) (360)
Indonesia	0	–	0	–	(0) (0)	(0) (0)	21	–	800	–	(624)(624)	(4615)(4615)
Malaysia	–	–	–	–	(187)(442)	(642)(642F)	–	–	–	–	(490)(490)	(787) (787)
Philippines	13	7	254	101	(186)(140)	(69) (71)	33	59	1585	1896	(503)(515)	(237) (515)
Papua New Guinea	–	1	–	5	(10) (10F)	(0) (10F)	–	1	–	15	(15) (15F)	(10) (9F)
Thailand	10	0	23	0	(15) (23)	(0) (53)	8	1	100	40	(80) (93)	(27) (170)
Latin America/Caribbean												
Bolivia	–	2	–	12	(-) (19F)	(1) (22F)	–	2	–	10	(-) (4)	(2) (1F)
Brazil	–	–	–	–	(200)(200)	(234)(234F)	–	–	–	–	(762)(762)	(902) (902F)
Ecuador	–	1	–	6	(2) (2)	(6) (3F)	6	6	121	121	(62) (55)	(85) (65F)
Honduras	0	–	0	–	(0) (0)	(0) (0)	–	–	17	–	(14) (14*)	(8) (8F)
Peru	–	5	–	54	(28) (28)	(14) (20F)	–	10	–	104	(38) (38)	(20) (20)
Trinidad and Tobago	–	–	–	–	– –	– –	–	–	–	–	– –	– –

1 Figures in the first bracket are from the FAO World Suveys (1983 and 1986) and figures in the second bracket are from the FAO Yearbook of Forest Products (1985)

Sources: 1) World Production Capacities Plywood; Particleboard and Fibreboard. FAO World Surveys 1983 and 1986
2) FAO Yearbook of Forest Products, 1985

Appendix 21

Sawlogs & Veneer Logs-NC - Production by Main Countries and Economic Regions

Countries/ Economies	Actual Averages 69-71	79-81	84	85 /8	Projected 86	87	88	90	2000	Growth Rates/A 61-84	70-84	85-2000 (% per annum)
Industrial	73070	71010	58516	63100	65700	65750	66400	67000	71000	-0.6	-1.4	0.8
N. America	38727	41922	34299	36500	38100	37900	38200	38500	39000	-0.3	-0.8	0.4
Unites States	34551	36681	29199	31000	32400	32200	32400	32500	33000	-0.5	-1.0	0.4
EEC-10	17832	16808	13810	15000	15500	15600	15800	16000	17500	-0.21	-1.2	1.0
Oceania	7237	5935	4764	5300	5500	5550	5600	5600	7200	-1.6	-2.8	2.1
Centrally Planned	34812	33586	33785	34200	34500	34600	34400	34300	34000	0.1	-0.5	0.0
USSR	22933	21233	21100	21500	21700	21800	21600	21500	21000	-0.4	-0.9	-0.2
E. Europe	11879	12353	12685	12700	12800	12800	12800	12800	13000	1.2	0.2	0.2
Developing	100795	146712	149890	144150	147565	150830	154220	156830	178500	4.3	2.8	1.4
Asia	63511	94161	98177	90500	92700	93450	94850	94700	101900	5.0	2.8	0.8
Malaysia	17923	27864	31590	31000	31500	31500	31500	30000	27000	7.0	4.1	0.9
Indonesia	10468	25251	26000	18000	18800	19200	19800	20450	25100	11.0	4.6	2.2
Philippines	10034	6023	3785	3700	3800	3900	4150	4400	4400	-3.0	-6.7	1.2
China	8606	13747	15839	16500	16700	16750	16900	17000	18000	4.1	4.9	0.6
India	7898	12350	12539	12700	13000	13100	13400	13600	16400	6.0	3.7	1.7
Africa	15511	17802	17134	18650	18900	19680	20020	20200	24000	2.7	1.1	1.7
Côte d'Ivoire	3915	4628	3895	4000	4000	4050	4100	4000	3700	4.6	0.1	-0.5
Nigeria	1354	4706	5081	5000	5000	5000	5000	5000	4500	7.6	12.9	-0.7
America	17410	27670	27342	27600	28215	29450	30550	32230	39600	3.5	3.7	2.4
Brazil	7423	13984	14285	14150	14465	14750	15000	16000	20000	4.7	6.0	2.3
World	208677	251308	242191	241450	247765	251180	255020	258130	283500	2.0	1.0	1.1
Memo Item: Industrial & Developing	173865	217722	208406	207250	213265	216580	220620	223830	249500	2.3	1.3	1.2

* * * * * * * * * * *

A/ Least squares trend for historical periods (1961-84); end-point for projected periods (1985-2000);
B/ Estate
Note: NC = Non-conifers, temperate and tropical

Appendix 22

ITTO Producing Member Countries Export of Tropical Hardwood Saw and Veneer Logs, Hardwood Sawnwood, Veneer, and Plywood in the Period of 1968 - 1985

(Production 1000 m^3)

	Products	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985
Africa													
Cameroon	Saw & Veneer Logs	647	472	599	397	654	843	743*	444*	448*	391*	496	746
	Sawnwood	60	38	54	62	75	83	83*	73*	75*	55*	91	86
	Veneer	14	4	14	22	18	26	20	23	19	23	28	27
	Plywood	8	8	7	7F	7F	7F	8	18	12	12	8	10
Congo	Saw & Veneer Logs	277	128	144	155	167	173	281	221	202	188	250	275
	Sawnwood	24	17	16	23	18	29	37	27	28	26	28	21
	Veneer	48	43	55	69	77	63	67	60	63	59	59*	50
	Plywood												
Côte d'Ivoire	Saw & Veneer Logs	3034	2419	3275	3229	2700	3199	3055*	2233*	2276*	2253*	2156	1345
	Sawnwood	275	212	292	340	318	293	277	266	308	383	397*	414
	Veneer	57	25F	38	36	36	46	48	47	44*	53	50	65
	Plywood	15	11	17	27	19	15	14	12	16	20	18	20
Gabon	Saw & Veneer Logs	1354	1100	1201	1627	1894	1173F	1071	1113	1160	1134	1536	1089*
	Sawnwood	4F	2	7	20	14F	5	18*	3	2	2	1F	1F
	Veneer	26	9	9	13	19F	17	19	21	14	9	2	8F
	Plywood	39*	51	26	39	39F	11	42*	39*	36*	44*	54*	46
Ghana	Saw & Veneer Logs	434	440	345	454	312	198	105	54	53	62	70	130
	Sawnwood	169	165	139	73	77	78	69	53	40	43	56	80
	Veneer	9	8	2	6	8	6	8	7	5	9	12	13
	Plywood	16	18	17	2	2	2	2			1		1
Liberia	Saw & Veneer Logs	259	220	513	357	311	389	475	255	230	223	184	252*
	Sawnwood	2	23	8	17	38	66	43	24	18	11	6	7*
	Veneer						2	2F	2F	2F			
	Plywood					7	6	2F	2	2	2	2F	2F

(Continued Appendix 22)

	Products	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985
Asia/Pacific													
India	Saw & Veneer Logs	25	33	37	28	28F	28	28F	6	7	7F	7F	7F
	Sawnwood	2	2	7	6	6F	2	2F	1				
	Veneer	2	1	1	4	4F	3	3F	4	3	3	3F	3F
	Plywood	29	15	33	15	15F	7	7F	6	6	6F	6F	6F
Indonesia	Saw & Veneer Logs	16873	12532	17695	18560	19200	17800	14884*	6201	3104	2993	1724	300F
	Sawnwood	278	394	649	594	756	1283	1203	1171	1222	1793	2198	2166
	Veneer										74	74F	108
	Plywood		1	13	17	70	117	245	760	1232	2106	2806	3575
Malaysia	Saw & Veneer Logs	12170	10792	15493	16099	16708	16488	15146	15866	19290	18795*	16000*	19771*
	Sawnwood	2008	1763	3019	2910	2787	3418	3141	2714	3049	3405*	2800	2740F
	Veneer	299	170	170	208	185	124	127	160	176	554*	556*	415*
	Plywood	215	233	407	344	410	466	474	467	402	479*	400*	373*
Papua New Guinea	Saw & Veneer Logs	655	372	444	402	445	445F	642	749	1063	1019*	1300	1158*
	Sawnwood	36	16	34	38	36	36F	45	24	21	20*	18*	15*
	Veneer	5	4	5	2	3	3F	2					
	Plywood	16	12	11	6	6	6F	6	8	6	5*	5*	1*
Philippines	Saw & Veneer Logs	4693	4596	2331	2047	2200	1248	1154F	1683F	1590F	1017F	1323*	679*
	Sawnwood	284	254	493	455	573	915	742	547	591	728	537	507
	Veneer	189	99	50F	36	31	50	63	39	45	123	71	69
	Plywood	171	157	260	340	383	417	367	398	249	312	269	269
Thailand	Saw & Veneer Logs	87F	1	49	32	17	1	1F	7	7F			
	Sawnwood	63	75	101	52	16	7	2	1	1	1	2	17
	Veneer		4	7	8	12	8	7	6	6	7	10	7
	Plywood	28F	9	11	5	1	2	2	4	2	2	2F	2F

(Continued Appendix 22)

	Products	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985
Latin America/ Caribbean													
Bolivia	Saw & Veneer Logs				2								
	Sawnwood	67	48	48F	53	48	86	91	43	53	24	24F	24F
	Veneer				7	8	2	2	1	1			
	Plywood			2			1	2	3	4	1	1F	1F
Brazil	Saw & Veneer Logs	140	5	7	4	10	13	7	6	8	4	30	26
	Sawnwood	326	187	261	405	391	593	622	569	394	455	446	421
	Veneer	39	42	49	49	47	36	40	43	47	54	52	52
	Plywood	30	32	45	52	79	111	99	113	81	147	206	229
Ecuador	Saw & Veneer Logs												
	Sawnwood	83	63	63	67	13	13	8	12	10	23*	31*	32
	Veneer												
	Plywood	2	2F	10	11	16	1	51	26	26	8	9	11
Honduras	Saw & Veneer Logs	2	1F	1	1F								
	Sawnwood	6	15F	10	8	3	3F	2F	7*	6*	1	1F	1F
	Veneer												
	Plywood	6	4	6	6	7	7	4	4	2			
Peru	Saw & Veneer Logs												
	Sawnwood	8	2	9	9	13	15	16	7	7F	7F	3	2
	Veneer	8	3	6	13	14	9	5	7	7F	7F		1
	Plywood				2	4	5	1	1	1F	1F	1F	1F
Trinidad and Tobago	Saw & Veneer Logs												
	Sawnwood	1	1	1	1F								
	Veneer												
	Plywood												

F: FAO Estimate.

*: Non-Official Source.

Source: FAO. Yearbook of Forest Products, 1985.