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world forest products demand and supply 1990 and 2000

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FOREWORD

The primary purpose of this publication is to make generally available a study presented to the Food and Agriculture Organization by a Forestry and Forest Industry Working Party. This study presents, in very considerable detail, estimates for 1960, 1970, 1980, 1990 and 2000, of production and consumption (and by implication net trade balance) of five wood product groups, separately for softwood and hardwood species groups. It also presents estimates of wood supply and of demands on the forest for two main categories of raw materials - sawlogs and fibrelogs - as well as of wood residuals created in processing the sawlogs and of the portion of these used as raw materials in processing pulp or reconstituted wood panels.

The origin of the study lies in the preparation for an Expert Consultation on World Pulp and Paper Demand, Supply and Trade, held in Tunis in 1977. FAO's Advisory Committee of Experts on Pulp and Paper charged an Industry Working Party with producing an outlook appraisal for the sector to 1990. The group, consisting of corporate planners, economists and market analysis officers of pulp and paper companies, backed up by a review panel of a hundred senior executives of this world industry, prepared detailed estimates for prospective consumption, production and trade of major grades of paper and of the pulp categories required.

That in-depth study was presented at the World Consultation and, with other papers, is available as a two volume document, from FAO.1/ Any sound appraisal of pulpwood supplies, however, clearly required an overall examination of the likely demand for all industrial forest products and the corresponding requirements for, and supply of, wood raw materials. Subsequently, there was established for this purpose a series of regional working groups of experts, not only from industry but also from universities and governments of countries important in forest production. FAO contributed its data base, policy guidance and an analysis of the prospective output of tropical forests. An ambitious time schedule, necessitated by limited staff availability of the Crown-Zellerbach Corporation, which has provided leadership of the study group over the entire period, precluded full participation of many countries. Nevertheless, information on all countries was taken into account, and special attention was given to most that have substantial forest resources or demand for wood products.

The FAO Advisory Committee of Experts on Pulp and Paper, at its Twentieth Session, received with great appreciation, the presentation of this major pioneer study on world outlook for wood products and timber supply.2/ However, a number of reservations were expressed concerning some aspects of the detailed findings

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1/ World Pulp and Paper Demand, Supply and Trade, Volumes 1 and 2, Selected Papers of an Expert Consultation held in Tunis, from 20 to 22 September 1977, published in 1978 as 4/1 and 4/2 of the FAO Forestry Papers.

2/ The study is presented in two parts, Phase IV covering consumption and production of forest products and Phase V covering the corresponding demand for and supply of wood raw materials. The detailed earlier pulp and paper study comprises Phases I, II and III.

of the study and it was recognized "that additional work would be necessary to make the study more acceptable". "The Committee suggested the possibility of a widely based working group of associations on pulp and paper and other industries which might, over the next year or two, bring the study to a more satisfactory stage".[1]

Resources did not become available for the very substantial and time-consuming additional work which would have been necessary for essentially a reworking of the entire integrated study, requiring a numerical balancing of numerous estimates from a wide variety of contributing sources.

Nevertheless, the Forestry Department of FAO, felt that the study is much too valuable to be limited in its circulation only to members of the Advisory Committee and the Working Party. It has, therefore, been decided to make the study available also in other languages of FAO, preceded by a substantial preface which draws attention to major reservations but emphasizes the great utility of this major original study, the importance of problems of consumption and supply to which it identifies and of its implications for future action.

In order to strengthen the preparation of this preamble, summaries of various aspects of the study have been reviewed with other expert bodies of Panel Products. Findings have been carefully examined by a number of FAO specialists. The broad findings of the study have also been presented to the FAO Conference in the forestry chapter of the preliminary version of the study "Agriculture: Toward 2000".

Most reservations, with respect to the findings of the study, stem from both the ambitious nature of its concept and the limited time available for its execution. For example, the attempt to separate softwood and hardwood when for many uses and products the species groups are interchangeable, is not only difficult with respect to the outlook for the future, but also from historical records it is difficult or even impossible to make this distinction, when wood based panels may comprise both species groups, let alone the fact that often no attempt was ever made to record the groups separately. A second reservation results from the pattern of presentation which balances, for each species group, for each product and for 17 separate countries or sub-regions, world consumption, production and trade and thus must propose only a single solution when many are feasible.

Further, the relative importance of different products, countries and sub-regions, coupled with diversities in ready and timely availabilities of experts, has resulted in uneven efforts and thus in degrees of refinement for individual estimates.

Again, because of limitations of time and space in such a detailed assessment, there was one set of assumptions with respect to growth of population and of income exposed as gross domestic product. Inevitably, many would prefer other assumptions.

Examples, rather than a catalogue of detailed points of reservation will illustrate the concern for caution which has been expressed with respect to use of the estimates in the study.

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[1] Report of the Twentieth Session of the FAO Advisory Committee on Pulp and Paper (FO:PAP/80/2).

Growth in product consumption is, of course, by growth in income and population, and levels of estimates are so related. There is, however, considerable opinion as well as historical pattern to support the criticism that the estimated growth in consumption of wood based panels is too modest, given the growth foreseen for sawnwood products, especially in the case of Western and Eastern Europe, and the USSR. For the USSR this was particularly so because of the already high consumption level of sawnwood and the declared policy of encouraging wood-based panels.

Other estimates which may represent possibilities, e.g. the USSR becoming a major exporter of softwood plywood, and rapid growth in Japanese domestic pulp production, in pulp exports of Oceania, Africa and the Far East, need to be seriously questioned rather than readily accepted.

Although, in general, FAO statistics were used in the study, there are many departures from this base. The reason for many differences are explained in the text but in other cases the reason is not apparent. For Africa, South of the Sahara, past exports and production of hardwood logs are clearly under-reported in the study.

Reservation was expressed with regard to the study estimates of past hardwood log consumption in other developing regions. It was felt that the raw material input ratios were low compared to actual historical values. Consequently, both historic and projected levels of hardwood roundwood demand were considered too modest. The opinion that both hardwood and softwood output of Latin America was under-estimated, particularly with regard to that of Africa and the Far East, was noted.

Although the study concept had initially encompassed fuelwood, lack of time as well as data problems led to the exclusion of the important product. This is a serious omission for the study because of increased competition for wood raw materials created by higher energy costs in many areas, and because of the critical nature of fuelwood shortages in much of the developing world.

For purposes of comparison and complementarity, attention is drawn to other work done by FAO itself. This includes some of the material on forestry provided for the overall agricultural sector study - Agriculture Towards 2000, and a summary of the results of a survey of the fuelwood situation and outlook in the developing regions where the great bulk of consumption occurs. This material follows immediately in brief summary, while the report of the Working Party is presented in its entirety as the main part of this publication.

INTRODUCTION

Projected Consumption: Industrial Wood

Three different sets of projections are summarized below. The first and second, using the scenario A and B assumptions of FAO on GDP growth, employ techniques developed in the Forestry Department which relate, by country, future per caput levels of product consumption to both level and projected growth of per caput GDP.[1] Projected populations are used to estimate national consumption levels. No specific recognition was made of prices except as stated below. Coefficients were derived from past relationships for each product group, separately for developed and developing countries, from the base period 1963-64 to 1973-75. Projections initially made at ten year intervals have been interpolated for 1980 and 1990 and extrapolated to 2000. Somewhat exceptional developments in stock accumulation and depletion during, especially, 1974 and 1975, have resulted in coefficients which produce apparent anomalies in projected consumption of sawnwood for individual developed countries. Consequently, projections for sawnwood in the developed countries using the same methodology, but with coefficients derived from a base period 1961-63 to 1971-73,[2] are used here. For wood-based panels in developed countries projections of consumption to 1990 and 2000 have been substantially reduced to make allowance for the changing impact of a recent levelling off and reversal of what has been a notable declining trend in real prices.

The third appraisal of the future outlook is that developed by the working group. This appraisal made use of GDP growth assumptions, which are intermediate to those of the scenario A and B alternatives of FAO, and of a variety of methodologies considered appropriate to the different products and regions. At successive stages of production - processed, semi-processed and wood raw material - a balance between consumption and production was drawn, at the world level, with regional imbalances resolved by an estimated allocation of net trade. Despite reservations, the estimates may generally be considered as a well informed, collective appraisal of likely development reflecting the evolving and limiting supply situation.

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[1] Projections of Consumption of Industrial Forest Products (FO:MISC/78/13 Rome, 1978).

[2] Described in European Timber Trends and Prospects, 1950 to 2000 (FAO/ECE, Geneva, 1976).

Table 1 presents the three sets of regional consumption projections for the three major processed product groups: sawnwood, wood-based panels and paper.1/ Generally, estimates of the working party are intermediate to, or slightly below the Lower of, those based on the FAO methodology for 2000. However, for wood-based panels, and paper in most developing countries, the working party estimates are consistently lower. Differences in consumption estimates for wood-based panels are partly accounted for by the considerably reduced rate of substitution of sawnwood by panels assumed (or implied) in the industry working party appraisal.2/

The growths in consumption, for the world as a whole, under the different approaches are as follows:

Product Group	Actual past 1963*-1975*	FAO Assumptions A	FAO Assumptions B 1975*-2000	Working Party
		Growth percent per annum		
Sawnwood	1.3	1.6	1.3	1.2
Wood-based Panels	6.9	5.5	4.5	2.7
Paper and Paperboard	4.4	4.3	3.8	3.7

(These figures all reflect the effect of the marked downward fluctuation of consumption in 1975 - reducing the historical growth rate and increasing the estimated future rate).

1/ It will be noted that the first two groups are shown in cubic metres and paper in metric tons, internationally generally accepted units. Direct comparisons are not simple, even in terms of the wood raw material input because of the common practice of using residues from processing sawnwood and solid wood panel product (veneer and plywood) in the manufacture of reconstituted wood panels and paper pulps. Sawnwood and solid wood panels require, according to wood species and product, in the order of 1.6 to 2.2 m^3 of roundwood from the forest to produce 1 m^3 of product, reconstituted panels about 1.6 m^3 of wood material per m^3 of product while 1 metric ton of paper require on the average about 2.8 m^3 of wood material (after allowance is made for waste paper and other fibre raw materials). About two fifths of residues from processing sawnwood, veneer and plywood is currently used for the other products.

2/ The FAO Forestry Department methodology used with the working party's income assumptions produced estimates to 2000 which were much higher for wood-based panels, a relatively new product group which has been characterized, over the past quarter of a century, by rapid but declining consumption growth rates.

Table 1 RECENT AND PROJECTED FUTURE CONSUMPTION
INDUSTRIAL WOOD PRODUCTS

				Scenario A			Scenario B			Extended Working Party		
	1963	1975—1979		1980	1990	2000	1980	1990	2000	1980	1990	2000 1/
				Sawnwood (million m^3)								
WORLD	362	422	447	458	525	626	451	503	577	455	520	570
Developed Market Economies	199	226	253	243	268	313	241	258	291	246	271	284
North America	100	108	124	117	143	178	116	139	169	2/ 118	2/ 129	2/ 133
Western Europe	61	68	78	70	69	68	69	65	60	74	81	86
Oceania	6	6	5	7	8	8	7	7	7	7	7	8
Other	32	44	46	49	48	59	49	47	55	47	54	57
Developing Market Economies	26	42	53	48	65	91	47	62	82	46	69	90
Latin America	12	19	24	21	25	34	20	24	31	17	22	27
Africa	1	3	5	4	8	12	4	7	10	5	6	10
Near East	3	5	7	5	7	10	6	7	9	6	8	9
Far East	10	14	17	18	25	35	17	24	32	18	33	45
Centrally Planned Economies	137	154	141	167	192	222	163	183	204	163	181	199
USSR and E. Europe	125	134	121	148	168	190	144	159	172	141	154	167
Asia	12	20	20	19	24	32	19	24	32	22	28	32
				Wood Based Panels (million m^3)								
WORLD	39	87	107	118	194	328	110	144	259	109	141	169
Developed Market Economies	33	68	81	89	142	227	84	103	184	84	106	122
North America	20	33	40	42	65	100	40	55	80	41	50	55
Western Europe	10	25	29	33	55	90	32	50	70	30	40	49
Oceania	–	1	1	2	3	4	1	2	3	1	2	2
Other	3	9	11	12	19	33	11	16	31	11	14	16
Developing Market Economies	2	5	9	9	20	39	8	14	26	6	11	18
Latin America	1	2	3	4	9	20	4	7	14	3	5	8
Africa	–	1	1	1	2	3	1	1	2	1	2	3
Near East	–	1	1	2	5	8	1	3	5	1	2	3
Far East	1	1	4	2	4	8	2	3	5	1	2	4
Centrally Planned Economies	5	14	17	20	32	62	18	27	49	19	24	30
USSR and E. Europe	5	14	17	19	28	52	17	23	39	17	21	26
Asia	–	1	1	1	4	10	1	4	10	2	3	4
				Paper (million mt)								
WORLD	87	145	170	188	286	411	178	262	367	180	256	357
Developed Market Economies	72	113	131	140	199	265	136	190	247	139	189	253
North America	41	58	67	72	100	132	70	97	125	70	92	120
Western Europe	23	36	43	44	60	78	43	56	71	46	61	79
Oceania	1	2	2	2	4	5	2	3	4	3	4	6
Other	7	16	19	22	35	50	21	34	47	20	32	48
Developing Market Economies	5	12	16	21	45	77	16	32	56	17	29	53
Latin America	3	7	8	11	21	37	9	15	26	9	15	26
Africa	–	1	1	2	4	7	1	3	4	2	3	4
Near East	1	1	1	2	7	11	1	4	9	2	5	11
Far East	2	3	5	6	13	22	5	10	17	5	8	13
Centrally Planned Economies	10	20	22	27	42	69	26	40	64	24	37	56
USSR and E. Europe	7	14	15	18	27	39	17	25	34	17	25	39
Asia	3	6	8	9	15	30	9	15	30	7	12	17

1/ Adjusted for differences in country grouping
2/ Adjusted for difference in historical data base

The obvious high level of uncertainty of estimates to 2000, especially for wood-based panels, is well illustrated by the differences in these estimates.

The rate of growth expected in developing countries is considerably more rapid than for developed countries in all levels of estimates. Sawnwood has historically comprised the great bulk of forest product consumption in terms of wood input. Despite the more rapid growth of consumption of paper and, especially, of wood-based panels, sawnwood continues to bulk as most important at the world level until near the end of the century when, even in the developing countries, paper is expected to become of equal or greater importance as it has already done in the developed countries.

Projected Consumption: Fuelwood

Consumption of fuelwood in developed countries steadily declined during much of this century, with the expanding use of fossil fuels, until the reactions to recent rapid increases in oil costs. Current developments vary. In most industrialized countries, expanded demand for fuelwood has resulted in increased competition with that for industrial wood but the high value of wood as a raw material limits its use for fuel. In North America there has been an obvious return to wood-burning domestic stoves, as well as a more significant movement to economize on energy consumption in wood products industry and to recover residues for use in energy production. In the medium term, for developed countries, fuelwood consumption, although expanding, will continue to be largely of low grade wood, sometimes chipped or compressed, used by rural inhabitants for heating in households or institutions and by forest industries themselves. In the longer term, energy plantations of fast-growing species for wood-derived liquid or gaseous fuels, on which there is now intense research, could play an important role in some countries. Nevertheless, it appears unlikely that, before 2000, there will be any substantial increase in the use of wood for energy in the developed countries, except in areas where lower quality wood is still in relative abundance (parts of North America, the USSR and possibly Oceania). The possibility for major industrial development of energy from wood also exists in wood rich developing countries.

In developing regions, as a whole, income increase might now be expected to have a positive effect on fuelwood demand, with the earlier trend to shift to fossil fuels offset by their price increases. For developing countries, per caput consumption of fuelwood might be assumed to remain fairly constant at least to the end of the century; increased consumption requirements might, therefore, be expected to be in line with predicted population growth, given continuation of wood supplies. However, in many wood-poor developing countries fuelwood supplies are completely inadequate to maintain current needs and an expansion in the use of wood as a fuel is physically not possible. In other developing countries the constraint may be lack of economic availability. Future consumption of fuelwood is, therefore, not likely to increase significantly except in a few developing countries, largely in Latin America, and in some will even decline. Thus, fuelwood consumption in developing countries as a whole may only increase from the 1979 level of 1,450 million m^3 to about 1,700 million m^3 by the end of the century. Were the fuelwood locally available, developing countries' consumption might be 2,400 million m^3 by year 2000 on the basis of current consumption and population growth, or as much as 3,000 million m^3 on the basis of estimated minimum needs. Fuelwood consumption and supply is, therefore, a major policy issue.

Other goods and services of the forest

In addition to fuelwood and wood for processed products, the forest produces a great variety of other goods and services. The consumption of poles and posts as well as other miscellaneous wood products used in the round, is included in the estimates and projections of industrial wood in Tables 2 and 3. Except in the case of some rural areas in developing countries, the trend is for decreasing consumption of these products. Hence, little change is foreseen for this group of products.

No attempt is made here to estimate present and future production and consumption of the myriad of other diverse products from forest trees and plants - gum arabic, medicinal supplies, oils and resins, fruits, nuts, wild honey, mushrooms, fodder and forage - or from forest animals and the food and materials for clothing they provide.

The environmental function of the forest - prevention of soil erosion by wind and water, regulation of waterflow quantity and quality, preventing floods, avoiding siltation of reservoirs and making clear water available in stable supplies; impact on the global oxygen-carbon cycle; modification of local climate and provision of recreational areas - which are of extreme importance in many areas are not dealt with here.

The resources base, production potentials and demand/supply balances

The supply of wood as raw material for industrial processing on the one hand, and of fuelwood or of other locally consumed products such as building poles or fence posts on the other, is markedly different in many respects. The industrial products can usually bear considerable transportation costs and usually a substantial portion of the supply is internationally traded. The other products, by contrast, are relatively low valued and bulky to handle and usually come from local supply areas. Fuelwood deficits are seldom met by supplies from beyond these local sources, while those in manufactured wood and pulp products, or even wood for their processing, frequently move over long distances and in large quantities. Where industrial wood is harvested, there is seldom any shortage of fuelwood, which is available from the forest, or from residues from logging and processing. Often in rural or agricultural areas, tree resources are limited, population pressures are great and fuelwood in heavy demand.

Thus, any appraisal of supply of these two categories of forest products must recognize different aspects of the resource with respect to location and to kind, size and quality of trees.

Table 2 summarizes the forest area of major regions, together with the average annual removals for the 1975* period. The total world area of closed forest[1] and other woodlands is estimated at about 4,000 million hectares, of which about half is in the developing world. The tropical closed forests alone cover some 1,200 million hectares, largely in developing countries. It is from these, and from the closed forests of the temperate developed regions, which come nearly all of the world's sawlogs, veneer logs and pulpwood. Fuelwood is drawn to some extent from these forests but much comes from

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[1] Formed by trees at least 5m tall with interlocking crowns.

Table 2 Recent Situation in Forest Resources, Wood Removals and Utilization

Region	FOREST AREA 1975		REMOVALS 1974-76 Annual Average			APPARENT CONSUMPTION		NET TRADE		
	Closed Forest	Other Woodland	Total	Fuelwood	Industrial wood	Industrial Roundwood for processing	Forest Products in roundwood equivalent	Industrial Roundwood	Processed wood (in roundwood equivalent)	Total (in roundwood equivalent)
	Million hectares		million m^3					Imports -	Export +	
WORLD	2,860	1,070	2,799	1,473	1,326[1]	1,185	1,185			
Developed Market Economies	693	243	761	57	704	732	763	-44	-31	-75
North America	510	120	454	18	436	412	390	+22	+22	+44
Western Europe	108	18	229	29	200	208	250	-18	-42	-60
Oceania	50	100	22	1	21	17	18	+ 3	- 1	+ 2
Japan	25	-	37	-	36	86	95	-50	- 9	-59
Other	-	5	19	8	11	9	10	- 1	- 1	- 2
Developing Market Economies	1,222	642	1,305	1,112	193	109	100	+32	+ 9	+41
Africa	203	360	327	294	33	10	11	+ 5	-	+ 5
Latin America	695	180	309	250	59	47	47	-	-	-
Far East	310	35	582	495	87	46	32	+27	+14	+41
Near East	14	67	87	73	14	6	12	-	- 6	- 6
Centrally Planned Economies	945	185	733	304	429	344	322	+12	+22	+34
USSR & E. Europe	815	135	468	96	372	287	265	+12	+22	+34
Asia	130	50	265	208	57	57	57	-	-	-

[1] Includes, in addition to wood for processing, roughly 10 percent of miscellaneous industrial wood, e.g. pitprops, poles, pilings normally used in the round; more than half is consumed in centrally planned economies.

other woodland, which is of primary importance in Africa, Latin America and the Near East. Considerable fuelwood is also supplied from small woodlots on farms, and scattered or row trees outside forest and woodland for which there are seldom systematic national estimates. The other woodlands of Canada, the USSR and Australia, which also bulk large in area, are likely to be little used for wood production before 2000.

Industrial wood supply

In much of the developed regions, forests are managed with a view to their producing wood on a sustainable basis and forest areas are relatively stable, with clearing for built-up areas often being compensated by natural reforestation on abandoned agricultural lands. Considerable areas for expansion still exist in the less accessible forested portion of Canada and the USSR but much of the remainder of the developed world is pressing close to the maximum potential of the natural forest. However, industrial plantations are adding to the potential in many areas, notably Japan, Oceania and parts of Europe.

The tropical closed forests are expected to be reduced by about 12 percent between 1975 and 2000, due largely to clearing for agriculture. There remains, however, considerable potential for expansion of industrial wood production in the wood-rich developing countries of Latin America and Africa, especially from presently less accessible areas.

Most harvesting in tropical forests for industrial raw materials is, and has been, for only a few selected species. For example, in West Africa removals rarely exceed 30 m^3 per hectare from forests with a growing stock of 250 to 300 m^3 per hectare. In time, most tropical forests will be left with relatively small quantities of these currently sought after species - which may of course attain a scarcity value - and only a major change in the species accepted by the market will enable these tropical areas to continue to supply wood in the longer term. Technological progress will make it possible to use a wider range of species from the tropical forest - where relatively few of the several hundred species in a forest area are utilized at present - and this will have a favourable effect on the economies of pulp production in those countries.

In the tropics, plantations for industrial wood are expected to increase from 5 million to over 16 million hectares by 2000. The supply of industrial wood from these is expected to increase more than tenfold from 1975 to 2000 with production reaching more than 100 million m^3 per annum by 2000. Latin America will account for about two thirds of the tropical countries' supply of industrial plantation wood, more than 60 percent of which will be of coniferous species, and industrial wood from plantations will be an important source of wood in that region.1/

1/ Largely under temperate conditions, China also has a very large plantation programme, but information on long-term production possibilities is not readily available.

Many of the world's forests have neither well-defined management objectives nor a reliable inventory, so that statements about their future yield must of necessity be speculative. Estimates of the range of future supply of industrial wood thus comprise, for regions with well-defined management and inventory, the best indication of sustained production with current resources and, for other forest resources, supply possibilities based on a judgement of current economic availability or accessibility.

World supplies are judged to be sufficient to meet a demand of something over 2,500 million m^3 of industrial wood by the turn of the century. That is to say the world's forests might be barely able to meet, on a continuing basis, the 2,600 million m^3 of roundwood required by 2000 for processing into sawnwood, panels and paper, at the FAO scenario A demand projection level without major management reorganization. The working party demand projections, which are shown in Table 3, require almost 500 million m^3 less than the FAO scenario A projection and appear to fall comfortably below this supply estimate at the world level. The scenario B projection requirements are intermediate. However, all projections imply major imbalances between regional supply and demand for both western Europe and Japan. Both will have to continue to rely to an increasing extent, on imports to bridge the growing gap between projected consumption of wood products and potential supply. Table 3 shows industrial wood removals as well as the trade pattern foreseen by the working party in balancing 2000 world demand and supply.[1/] Included are also estimates of fuelwood consumption on the assumption of supply trends continuing.

In tropical regions, additional supplies of industrial wood would come from less accessible areas but particularly from presently under-utilized species, sizes and grades and from plantations. Africa and Asia, where current removals of industrial wood amount to 33 and 86 million m^3 respectively, might reach respectively a tripling and doubling in the removals destined for domestic processing or export by 2000. If these levels of supply are actually achieved, both regions would be able to meet their projected domestic demand for either A or B scenarios. However, their exports of veneer, plywood and perhaps sawnwood, or of logs for processing would not likely meet the import requirements indicated for the developed regions by either the scenarios. Latin America is likely to be able to meet its projected consumption at any projection level and to have a quantity potentially available for export substantially above that indicated in Table 3.

North American industrial removals are expected to expand by approximately one-half by 2000 but the increase will contribute little to net exports. The USSR is estimated to have sufficient wood supply for its projected needs with a substantial quantity available for export, although much is remotely located.

The additional wood requirements foreseen for the developing countries in alternative A as compared to the working party estimates are predominantly for wood-based panels (plywood, particle board and fibreboard) and for paper. As only plywood requires large-sized trees and high quality material, the

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[1/] Some aspects of this trade are examined in Prospects for Inter-regional Trade in Forest Products and Their Influence on National Forest Policies in Europe, Secretariat Note to Nineteenth Session of the European Forestry Commission (FO:EFC/79/10), 1979.

Table 3 Projected Situation, Estimates of Wood Removals and Utilization in 2000

Region	FOREST AREA		REMOVALS			APPARENT CONSUMPTION		NET TRADE		
				Annual Average						
	Closed Forest	Other Wood-land	Total[1]	Fuel-wood	Industrial wood	Industrial Roundwood for processing	Forest Products in roundwood equivalent	Industrial Roundwood	Processed wood (in roundwood	Total equiv.)
	Million hectares		. . . .	. . . .	. . . .	million m^3	. . . .	. . . . Imports –	Exports +	. . . .
WORLD	x	x	3,910	1,820	2,085	1,930	1,930	–	–	–
Developed Market Economies	x	x	1,165	70	1,093	1,138	1,190	–78	–52	–130
North America	x	x	670	28	642	617	581	+10	+36	+48
Western Europe	x	x	350	30	320	325	384	–16	–59	–75
Oceania	x	x	60	2	58	41	30	+16	+11	+27
Japan	x	x	58	–	58	143	175	–86	–32	–118
Other	x	x	25	10	15	12	20	– 2	– 8	–10
Developing Market Economies	1,090	x	1,715	1,350	365	274	238	+44	+36	+80
Africa	190	x	360	300	60	28	21	+10	+ 7	+17
Latin America	620	x	525	400	124	108	98	+ 5	+10	+15
Far East	270	x	760	600	161	128	96	+29	+32	+61
Near East	10	x	70	50	20	10	23	–	–13	–13
Centrally planned Economies	x	x	1,030	400	627	518	502	+34	+16	+50
USSR & E. Europe	x	x	630	100	531	444	428	+34	+16	+50
Asia	x	x	400	300	96	74	74	–	–	–

x = Not estimated

[1] Rounded

additional supplies of wood should generally be available in respective regions. For the developed countries, however, the additional requirements indicated in alternative A would necessitate substantial imports of wood raw materials or their products in most of the regions, except the USSR and Oceania.

The working party analyses distinguish between hardwoods and softwoods and in so doing draw attention to the necessity of meeting a substantial part of the projected increase in demand by an increased use of hardwoods in fields of utilization that have been traditionally softwood. The increase in hardwood pulpwood is 45 percent of the total increases of this assortment, whereas the 1975 share of hardwood pulpwood removals was only 34 percent of total pulpwood removals.

The increases in removals by 2000 over 1975 also imply more than an 80 percent increase in pulpwood removals but less than a 44 percent increase in sawlog removals; inter alia this has implications for harvesting costs. In the same period the use of residues is expected to double and the use of non-wood materials such as bagasse and bamboo to increase appreciably.

Following are the increases foreseen in the analysis for the supply of industrial wood:

WORLD		Actual 1975	Change projected (+)	
		millions m^3		
Hardwood logs		220	100	Tropical countries +80
Softwood logs		570	292	USSR +85, North America +65, Europe +20, Japan +20
	Total logs	790	392	
Hardwood pulpwood & miscellaneous		171	182	North America +65, Tropical Countries +50, Europe +40
Softwood pulpwood & miscellaneous		369	181	Europe +60, Tropical Countries +45, North America +45
Total pulpwood & miscellaneous		540	363	
	TOTAL	1,330	755	
Residues used		157	146	

Should demand reach the FAO Alternative A projection level, the great bulk of the additional 500 million m^3 of wood required might be expected to come, at a considerably increased cost, from the tropical forests of the Amazon Basin and the less accessible coniferous forests of Siberia and from lower quality North American hardwoods. Additional quick-growing plantations in the tropics would also be needed.

Fuelwood Demand/Supply Balance

The 1980 fuelwood supply situation, in relation to consumption and needs, has been assessed for developing regions (excluding China), with an outlook to 2000. This first comprehensive review of available information was recently undertaken by FAO1/ on the basis of 228 subdivisions formed by combinations of 20 ecological zones with areas of varying population densities. Within the units, existing and prospective vegetation cover and their mean annual fuelwood productivity, mean annual fuelwood needs as well as present and future population, were taken into account. Urban areas were given separate attention. On the basis of these assessments, four categories of supply/demand situations were identified, as described below.

Areas of acute scarcity are those where existing wood resources have been depleted to levels where populations are no longer able to obtain sufficient fuelwood to meet even their minimum energy needs. These include areas immediately south of the Sahara, arid and sub-arid areas of East and Southwest Africa, and predominantly mountainous areas and islands of Southeast Africa, involving in 1980 a rural population of 50 million as well as 5 million in major urban centres; predominantly mountainous areas of Central Asia involving 30 million rural people, as well as 140 million urban dwellers in Asia; and in South America, the Andean Plateau, arid areas along the Pacific Coast and more densely populated areas involving 18 million rural inhabitants and 6 million in major urban centres. The total population in these areas is nearly 100 million rural and 150 urban inhabitants.

Areas of deficit situations are those where populations are still able to meet minimum fuelwood needs but only by cutting in excess of sustainable supply, i.e. the wood resource is already inadequate to meet present needs but consumption may be temporarily maintained by resource depletion. These areas are the Soudano-sahelian and Soudanian regions of West, Central Africa and savannah areas of Southeast Africa with 130 rural inhabitants and 15 million in major urban centres; North Africa, Iraq and Turkey with 70 million rural inhabitants, and other less densely populated arid areas of the Near East with 35 million rural inhabitants; heavily populated areas in the Indo Gangetic plains of Central Asia (in Pakistan, India, Bangladesh and Nepal) and in South and Southeast Asia (notably southern India, central Thailand and Java) with a total of 710 million rural inhabitants; the medium to high parts of the Andes and in arid and semi-arid zones of Latin America with 140 million rural inhabitants and 25 million in urban centres. Thus, a total of 1,050 million rural and 50 million urban inhabitants are in areas where the resource is being depleted to maintain fuelwood supplies.

1/ See Map of the Fuelwood Situation in the Developing Countries, FAO, 1981. A fuller report is expected in 1982.

Prospective deficit areas are those in which supplies exceed 1980 demand but which are expected to change to a deficit situation by 2000 with a continuation of present trends. These include savannah areas of West, East and South Africa with 70 million rural inhabitants and high forest zones in West and Central Africa with fast-growing populations, with 30 million rural and 5 million urban inhabitants; many areas in South and Southeast Asia with 150 million rural people; and numerous zones in Central America, and South America with 30 million rural people and 50 million in urban centres. This is a total of 280 million rural and 55 million urban people.

Areas where, as a whole, there will still be adequate fuelwood supplies in 2000, but local shortages in and around urban centres, are limited to the high forest areas of Central Africa, Asia and Latin America and in Korea where an important forest plantation programme has reversed a former deteriorating situation. The total 1980 population of these areas is only about 180 million. Thus, a total 1980 population of 1,400 million live in areas judged to be consuming less than their fuelwood needs or are meeting them by depleting the wood resource. Sustainable supply is estimated to already fall nearly 400 million m^3 short of needs in rural areas alone.

By 2000, it is foreseen that, unless present trends are changed, there will be a total of as much as 3,000 million people in areas where fuelwood supplies will be inadequate for needs, with an estimated shortfall of nearly 1,000 million m^3 between needs and sustainable supply in rural areas alone.

The existing - and the much greater threatening - imbalances between prospective fuelwood needs and supply are of extreme importance because of: (1) the essential and nearly irreplaceable nature of energy from wood for preparing food to make it edible and digestable and (2) the irreparable damage by depletion of the vegetation environment and the resultant permanent loss of soil protection and water flow stabilization.

In some areas the situation is already so drastic as to justify immediate relief activities in the form of subsidized alternate fuels well beyond the means of those unable to obtain wood supplies.

In addition to the major concern about fuelwood supplies in the forest-poor countries, there must also be concern even in those well forested countries where there is no abundant tree cover near to population centres and where heavy demands already foreshadow resource destruction and declining consumption. International, or even medium distance national trade of fuelwood is not usually a solution because of bulky and costly transportation and limited purchasing powers in deficient areas. Charcoal trade is a better possibility for supplying, especially urban markets.

Many opportunities exist to conserve wood fuels. There is considerable potential for increasing the efficiency of wood as a fuel through better designed simple wood burning stoves made from local materials. Production of charcoal can also be made more efficient as can the wood and charcoal burning of local processing industries. Charcoal from wood of non-commercial species and from logging residues can be produced and transported some distance. More intensive management of existing tree resources is often the simplest, quickest and cheapest way to increase the supply of fuelwood.

Such measures, however, cannot alter the need in the long run to create, with the active involvement of local people, new fuelwood sources by tree planting in village woodlots, or in small groups or lines along the borders of agricultural fields, on roadsides and river banks where this is compatible with the local agricultural practices, often with species not suitable for industrial wood products and which might be primarily regarded as a source of fruit or fodder. In some situations, species (e.g. vigorous tree shrubs) which can produce fuelwood quickly, combined with less fast yielding species which will in the longer run give both industrial wood and fuelwood, may be appropriate. Such programmes will, however, require substantial investment funding not only for the creation and maintenance of tree nurseries and plantation establishment but also for plantation tending before results can be obtained.

Conclusions

The projected increase in the combined world demand for fuelwood and industrial wood from 2,800 million m^3 in 1975 to 3,900 or even much more by 2000, carries with it both an opportunity and a challenge to make better use of the world's forest resource in a manner that will avoid devastation of environmentally sensitive areas and ensure a greatly augmented and more equitably balanced supply of forest goods and services.

Well-defined land use policies, which favour both maintenance and creation of forest areas and, in appropriate instances, their systematic transfer to other uses without wasteful loss of wood material, are an essential basis for dealing effectively with continuing provision of wood supplies and other forest benefits, including those of an environmental nature. In many instances, intensified forest management, will be necessary to ensure adequate supply. Much research and development work also remains to be undertaken with respect to the interrelations of the forests with agriculture and with other aspects of the environment, as well as on ways of ensuring more effective use of forests for the welfare of the rural poor. It is also evident that availability of trained personnel and investment funds may frequently be an obstacle to required production, necessitating early anticipation of training needs and, with an appropriate time lead, development planning of the sector including resource inventories and market appraisals.

The following major points are noted:

a) By the end of the century, demand for industrial forest products will put considerable strain on supply, particularly for some assortments (tropical hardwood logs, softwood logs and pulpwood) and for all wood in some regions (Japan and western Europe).

b) Among the developing regions, Asia and Africa, which have been major suppliers of wood on international markets, will have to direct relatively more of their industrial wood production to domestic demands.

c) Fuelwood supply is already becoming critically short in wood-poor countries, or parts of countries, and unless special measures are taken the problem will become increasingly severe with as many as 3,000 million people in danger of inadequate fuel by 2000.

d) In many areas, forest depletion, largely from uncontrolled agricultural expansion in moister areas or from fuelwood harvesting in more arid areas is leading to a loss of the environmental protection of the forest. Floods, drought, erosion, siltation and a serious loss of agricultural production are often the results.

e) Investment requirements are large, especially for replacement and establishment of industrial plant, particularly for pulp and paper production, as well as for maintaining forest production. Requirements for new forest plantations, especially for fuelwood, are substantial. Funding is not readily available in very many instances.

f) Trade expansion possibilities are great. For tropical forest areas there is the continuing need to increase the base of utilized species, sizes and qualities. A much greater proportion of processing will be done in developing countries enabling them to take advantage of the value added. It will, however, mean that some importing countries must limit their imports of raw materials and the processing based upon them.

g) Training of forest managers and personnel for industries for developing countries must intensify if their institutions and industries are to be adequately staffed to undertake the essential tasks within the sector.

h) Agro-forestry and pastoral-forestry have a large potential in joint wood and food production, particularly as this approach provides greater safeguards in many environmentally critical areas than do most other practices. The promotion of selected tree species which have various desirable combinations of wood, food, fodder or fertilizer production characteristics, is particularly promising.

PHASE IV

WORLD OUTLOOK
FOR FOREST PRODUCTS

PHASE IV

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WORLD OUTLOOK FOR FIBER PRODUCTS

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INTRODUCTION

1.0 INTRODUCTION

1.1 SUMMARY

This report to the Food and Agricultural Organization of the United Nations by the world's forest industries presents a world outlook to the year 2000 for fiber products. It contains consumption forecasts in cubic meters (cbm) for the major groups of industrial products which are produced from wood fibers. The report also presents estimates for the self-sufficiency of 17 world regions for each major product group. The consumption and self-sufficiency estimates are separated into two wood fiber categories coniferous and non-coniferous products. For each wood fiber category the "solidwood" products (such as sawnwood, plywood and other industrial roundwood) are separated from the "fiber" products (such as reconstituted panels and pulps).

In general, the report projects a slowing of the historical growth trends for fiber products. Coniferous products, referred to as "softwoods" in the report, are forecast to grow at an annual rate of 1.8%, down from an estimated 2.4% for the 1960-80 period. Their consumption is projected to rise from 863 million cbm in 1980 to 1233 million cbm in 2000. Non-coniferous products, referred to as "hardwoods", are forecast to grow somewhat faster but from a smaller base. Between 1980 and 2000 world consumption of hardwoods is forecast to rise from 370 to 585 million cbm. This projected annual rate of 2.3% is down sharply from the 3.2% rate estimated for the 1960-80 period.

Both "solidwood" and "fiber" products are projected to have a slower growth rate during the next two decades than they are expected to experience in the 1960-80 period. Annualized growth of "solidwood" products is expected to drop from 1.3% to 1.0% between those two periods. The change in growth of "fiber" products is expected to be more dramatic, down sharply from 4.6% to a 2.8% annualized rate.

The reader of this report is cautioned about using the outlook presented as a definitive forecast. There are several weaknesses in the data which underlie the report's projections. Among the most significant weaknesses are the historical data base (which in some cases had to be created or adjusted by the Working Parties) and the pulp outlook from 1990-2000 (which is based on mere extrapolation of the Phase II and III consumption forecasts for the 1980-90 period). It should also be noted that this outlook has been a "rush" exercise. The three regional Working Parties only commenced their activities in February/March 1978, they worked through the outlook's extensive methodology in only a few months and had little time for gaining the judgement of experts to validate their views. Thus, the report is most appropriately considered as a discussion document which identifies potential key trends. When viewed in this context, however, the Working Party does believe that it provides a useful base for considering the emerging regional pressures on the world's softwood and hardwood resources.

1.2 BACKGROUND

Readers of Phases I, II and III of this report are aware of its genesis. The first three phases were presented by industry to FAO during the World Consultation of Experts in Tunis, September 1977. At that time, the experts noted a potential problem with the pulp and paper consumption outlook contained in the industry report. This possible problem related to the demand on the forest for products other than paper pulps. The experts questioned whether an adequate supply of appropriate fibers existed to meet the demand of all industrial products. In their recommendations to FAO, they suggested that industry extend the study's focus to encompass the demand for other wood products and the world supply of fiber.

Subsequent to the Tunis meeting, FAO decided to charter this extension of the study. The Assistant Director-General, Forestry Department, requested Crown Zellerbach Corporation to continue in its role of providing leadership for the study which Crown Zellerbach agreed to do. Crown Zellerbach proceeded to develop the requisite approach, methodology and structure and since that time has been responsible for coordinating the study's execution.

To accomplish this task it has been necessary to recruit a new Working Party. The expertise of the specialists in Phases I, II and III was primarily centered in the pulp and paper sector. A new team of experts has been obtained through the combined efforts of several organizations (particularly FAO, ECE, API and CPPA). Because of the fragmented nature of the wood products business, however, the new Working Party has not been drawn exclusively from industry. Representatives from both academia and government have made significant contributions to the outlook presented in this document and Phase V.

To focus the Working Party's efforts on the areas of their greatest expertise, responsibility for developing the world's consumption outlook has been divided among three regional teams. One team has covered the Western Hemisphere. The second team has dealt with Europe, Africa and the Soviet Union. The third team has provided the outlook for Asia. Appendix I shows the Working Party's composition and major areas of focus.

Because of the Working Party's size and expertise, the time constraints associated with completing the project, and the difficulty in finding global experts for these phases of the study, the Working Party has not established a separate

Review Board to evaluate its preliminary findings as was the case with Phases I, II and III. Instead, the Working Party has drawn on the expertise within teams to act as a cross-check on the preliminary outlooks developed for each region. The regional teams have first developed forecasts for consumption within their own regions. Imports and exports for each product category have been balanced in a joint meeting. Supply has been created in regions of potential surplus to match the import requirements of deficit regions. An extensive dialogue has occurred between the regional teams to identify the most likely geographic source of the deficit products.

1.3 OBJECTIVES

The basic objective of Phase IV has been to forecast the consumption of wood fiber for all "industrial" uses. The major products included in this grouping are sawnwood, plywood, reconstituted panels, other industrial roundwood (such as poles and pilings) and pulps. The demand which these products place on the forest resource has been estimated in terms of "product volume". Product volume relates to the amount of wood fiber actually within the finished product, not the amount needed to make it. Fuelwood has been excluded from this phase of the study.

Other changes which are occurring within the forest products sector have also been assessed. Demand on the forest has shifted in recent years. For example, an increasing share of the world's forest products is being produced from wood converting plant by-products. Another trend is the growing use of hardwood fibers which are becoming increasingly prominent in the world's product mix. Two secondary objectives of the study, therefore, have been to forecast the future share of "solidwood" products vs. those which can be produced from mill residuals and to project future changes in the softwood/hardwood split.

1.4 APPROACH

The Working Party has used a number of approaches in developing its forecast for world fiber products consumption. For some products and regions the approach has been quite sophisticated. For North American lumber and panels, for example, an intensive assessment of demographic and economic factors has served as the foundation for consumption estimates in the residential and non-residential sectors. For some regions and products, however, the forecasting approach has been very rudimentary. Where the volumes are of low magnitude, and the data base sketchy, the Working Party has merely extrapolated historical trends. Thus, the quality of analysis which underlies the projections is spotty, but the Working Party has directed its energies toward addressing in detail the most sensitive products and geographic regions.

The Working Party has maintained the 1975-90 outlook prepared for Phase I for pulp and paper. The 1980 view developed in this outlook continues to be on target. The 1980-90 growth rates still appear to be reasonable. One weakness of the study, however, is that no economic growth assessment has been made beyond 1990. Thus, the Working Party has resorted to extrapolation as the basis for its economic growth forecast. For the 1990-2000 period it has typically applied the same growth factors which it has used for 1980 to 1990.

There is, however, one further area of the study which has to date received only limited effort relative to its impact on the total outlook. That area relates to the fiber requirements for pulp products, particularly in the 1990-2000 period. The Working Party has not prepared a new assessment of potential pulp supply by region to cover the 1990-2000 period. Compounding this basic weakness is the limited data about current or future fiber requirements per ton of pulp produced. There is no cohesive data base which breaks down a region's pulpwood consumption by grade and fiber type. The Working Party has applied its best judgment to this problem but nonetheless has needed to estimate the historical relationships which form the basis for future projections.

The forecasts presented in this document are generally based on individual forecasts of each product group's components. The Working Party has prepared for most regions independent forecasts for sawnwood, sleepers, plywood, veneer, fibreboard, particleboard, pitprops, other industrial roundwood and dissolving pulp. These forecasts have typically been prepared separately for softwood and hardwood, although in a few cases the product category has first been forecast before estimating the softwood/hardwood mix.

The Working Party's approach to regional self-sufficiency is similar for fiber products to the approach used in Phases II and III. For each region the consumption outlook has been compared with historical self-sufficiency and future roundwood supply. In general, supply for deficit regions has been assumed to come from those surplus regions which are traditional suppliers. The U.S.S.R., for example, is projected to continue as a major sawnwood supplier to Europe. New suppliers to a deficit region have been assumed only when the traditional suppliers' resource base is tightly stretched. An example of this type shift is the assumed generation of softwood sawnwood supply in Oceania during the 1990-2000 period. Sawnwood imports into the markets traditionally served by North America is expected to exceed its export capability, while Oceania's plantations will have matured to sawtimber quality.

The Working Party has used the same regional breakdown established for the first three phases of the study. It has, however, made one modification by expanding the number of sub-regions from 15 to 17. Instead of addressing the Centrally Planned Economies as one consuming bloc, the Working Party has separated them into Eastern Europe, the U.S.S.R. and Centrally Planned Asia. The primary reason for making this division relates to the markedly different conditions that are found in these three sub-regions. By assessing them separately, the Working Party believes that it has narrowed the margin for error.

1.5 HISTORICAL DATA BASE

The Working Party has used FAO's data base as its basic historical series for production, consumption and trade. It has, however, in several instances departed from that data base. FAO is dependent on governments and trade associations for its statistics. In some cases, the numbers supplied to FAO are clearly erroneous. One example of this problem arises in the United States which reports its sawnwood consumption in nominal (2"x4") vs. actual (1½"x3½") measure. Another example comes from the Soviet Union's apparent difference with FAO on nomenclature for other industrial roundwood which is clearly in opposition to its consumption of sawlogs. The Working Party has replaced official statistics and forecasts with its own estimates in situations like the above where the Working Party believes it has better information.

A second weakness of FAO's data base relates to the estimates contained therein provided by FAO itself. Centrally Planned Asia represents the most extreme case in this regard. The Working Party has reviewed the literature which is available regarding wood fibers in China and decided to deviate somewhat from the estimates developed by the Secretariat.

A third weakness in FAO's data base relates to world trade. For a number of reasons exports and imports of products do not match. In this respect the Working Party has improved on history. In order to have a consistent series of production and consumption statistics, it has used its judgment to balance world trade.

The other significant difficulties related to the FAO data base have been touched upon in section 1.4. They relate to the problems of identifying the softwood/hardwood share of each product and the fiber component of each pulp quality. Despite the above weaknesses, however, the Working Party has used the FAO statistics as the base for its analysis, recognizing that with its limitations it still represents the only cohesive set of statistics about the world forest products industry. Accordingly, the Working Party has modified the FAO statistics in situations in which there appear to be discrepancies and then used the modified data base for identifying historical trends and developing its long-range outlook.

1.6 PRODUCT DEFINITIONS

The products forecast in this report follow the definitions used by FAO for reporting the forest product statistics. Specific descriptions can be found in the 1976 Yearbook of Forest Products, pages XIV to XVI. For simplification in reporting, the products have been combined into five product groups: sawnwood and sleepers, "solidwood" panels, reconstituted panels (particleboard and fibreboard), other industrial products (pitprops and other industrial roundwood), and pulps (mechanical, semi-chemical, chemical, and dissolving).

The fiber types have been separated into "softwoods" and "hardwoods". The "softwoods" are identical to the coniferous species listed on page XIII of the 1976 Yearbook of Forest Products. The "hardwoods" are those species classified as "non-coniferous" or "broadleaved" on the same page. The terms "fiber" and "fiber products" as used in this report are limited to wood fibers. Other fibrous products such as bagasse, bamboo, flax, hemp, keraf and straw are identified as "non-wood fibers".

Statistics presented in this report are in cubic meters, "fiber volume". This term has been created by the Working Party to provide a means of unifying the product groups into one cohesive set of units. Fiber volume means the amount of unbarked wood per reported measure of product volume. In general, the "fiber volume" for wood products is identical to their physical volume. One cbm of sawnwood, for example, contains one cbm of wood. Reconstituted panels, however, can contain more or less than one cbm of fiber per cbm of product - depending on how compressed the fibers are. Wood pulps are measured in tons rather than cubic meters of fiber; accordingly they need to be converted into fiber volume equivalents to be appropriately represented in the statistics for fiber consumption.

The term "self-sufficiency" refers to a region or sub-region's percentage of product produced divided by product consumed. Thus sub-regions such as Canada or the Nordic Countries are more than 100% self-sufficient in products such as sawnwood and chemical wood pulp; they are net exporters of these products. The converse applies to countries such as Japan and the United States. They are net importers of both products and have a self-sufficiency level below 100%. It should be noted that the self-sufficiency calculation applies only to the product group specified in its original form. Thus pulp products which are imported or exported in the form of paper and paperboard do not enter into the self-sufficiency calculation for pulp.

1.7 STATISTICAL TABLES

The Working Party's outlook is presented in the form of statistical tables with a supporting narrative. The tables provide summaries by decade from 1960-2000 for each product group's consumption and trade. The statistics shown for the years 1960 and 1970 are three-year moving averages. The figures for 1980, 1990 and 2000 are forecasts of the expected trend consumption and production levels for those years. The Working Party has rounded its consumption and trade statistics at the level of 100,000 cubic meters, believing that any further level of detail would tend to be both inefficient and misleading. Because of its perception that softwood fibers may be increasingly scarce, it has presented its outlook for softwood and hardwood fibers separately.

1.8 EXCLUSION OF FUELWOOD

As noted in paragraph 1.3, the Working Party has excluded fuelwood from the report despite its important role in world wood consumption. Fuelwood will undoubtedly continue to constitute the bulk of wood consumption in some areas of the world. Unfortunately, the statistical basis for fuelwood and the methods for estimating consumption are particularly weak, especially for those countries where its use is most significant. There is indeed some competition between fuel and industrial uses for wood, particularly for some of the by-product residuals which historically have had a low value. The Working Party has attempted to give recognition to the potential impact of changing energy cost relationships in its assessment of potential industrial wood supply (Phase V). It recognizes, however, that the issue of fuelwood demand and supply trends deserves additional attention and suggests that fuelwood's unique problems be addressed in a separate assessment.

1.9 RESPONSIBILITY FOR OUTLOOK PRESENTED

The outlook presented in this forecast is fundamentally a concensus of the Working Party's views. Each regional team has provided the basic consumption outlook for those countries where it has expertise. These teams have, however, been challenged by other members of the Working Party when their outlooks appeared to be overly optimistic or pessimistic. As future supply problems have emerged, the regional team coordinators have interacted with each other to identify the most probable sourcing regions. The June 1978 joint Working Party session in Rome has served as the major opportunity for rationalizing divergent supply and consumption outlooks. There have been, however, numerous interchanges subsequent to that date to develop the outlook which is presented in this report.

The ultimate responsibility for the statistics and outlook presented in this document rests with the project leader who has coordinated the project from its inception. He has been responsible for ensuring the development of a consistent outlook. Where regional consumption or trade outlooks have been challenged, he has coordinated (and if necessary selected) the specific view to be presented in the report. The differences between regional Working Party teams, however, have been minimal, so the outlook presented is fundamentally a true concensus of the experts involved.

WORLD OUTLOOK

2.0 WORLD FIBER CONSUMPTION OUTLOOK

World consumption of wood fiber in industrial products is projected to rise from 1,233.0 million cbm in 1980 to 1,818.5 million cbm in the year 2000. The greatest growth is expected in the area of wood pulps which are expected to rise from approximately 511.5 million cbm in 1980 to 894.6 million cbm in 2000. Sawnwood products by comparison should increase only modestly, rising from 428.8 to 542.5 million cbm during that period. Although softwood products are forecast to show the greatest absolute growth, their share of the world's industrial fibers is projected to decline from 70% to 68% during that period. Table 2.0 shows the growth by product group and fiber type estimated by decade from 1960 to 2000.

2.1 SAWNWOOD & SLEEPERS

World consumption of sawnwood and sleepers is expected to grow slowly during the next two decades. The Working Party expects that 1980 consumption of these products will be approximately 428.8 million cbm, up from 325.6 million cbm in 1960. This is an annual growth rate of only 1.4%. By the year 2000, the Working Party forecasts consumption to reach a level of 542.5 million cbm. The growth rate for this period is expected to decline to 1.2%. The major underlying causes of this decline are the expected slowing of world economic growth coupled with slower growth in the population of the developed market economies.

This projected decline in the growth of sawnwood consumption should be particularly noticeable in softwoods. Their growth is expected to drop from 1.3% in the 1960-80 period to 1.0% between 1980 and 2000. By comparison, hardwood sawnwood's growth is actually projected to increase, rising from a 1.5% rate to 1.8% during the same periods. Tables 2.1.1 and 2.1.2 show the outlook projected by region for each of the product groups.

World trade in sawnwood is projected to increase substantially during the next two decades. Interregional trade[1] of sawnwood is expected to rise from 8.7 million cbm in 1960 to 13.9 and 18.9 million cbm in 1980 and 2000 respectively. Even in percentage terms, this increase is still significant. Compared with 2.7% in 1960, interregional trade of sawnwood is expected to rise to 3.2% in 1980 and 3.5% in 2000.

2.2 PANELS

Consumption of panels should continue to grow more rapidly than that of sawnwood with plywood and particleboard consumption both showing higher rates. Compared with the 142.7 million cbm projected for 1980, world consumption of panels should rise to approximately 225.4 million cbm in 2000, an annual rate of 2.3%.

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[1] Interregional trade is here considered to be the net trade of the six major regions recognized by the study. Intercountry trade and indeed trade between the 17 sub-regions is much greater.

Solidwood panels are expected to increase from 48.4 million cbm to 69.5 million cbm, an annual increase of 1.8%. Reconstituted panels should rise more rapidly from 94.3 million cbm to 155.9 million cbm, a 2.5% annual increase. Tables 2.2.1 through 2.2.4 show the Working Party's estimates for panel consumption. Table 2.2.5 has been provided to show the product volume estimates for reconstituted panels which apply to the fiber volumes shown in Tables 2.2.3 and 2.2.4.

The Working Party foresees no major consumption shift in the softwood/hardwood split for panel products. Softwood's share is projected to decline from an estimated 61% in 1960 to 60% in the 1980-2000 period. It should be noted, however, that the historical statistics for softwood and hardwood's share of reconstituted panels are not generally available and that the Working Party's estimates for these data may be, in some instances inaccurate.

World trade in panel products is expected to grow markedly during the 1980-2000 period, but from a small base. Hardwood plywood is likely to see the greatest growth, rising from 5.2 million cbm in 1980 to 9.6 million cbm in 2000 as Asia's producers expand their exports. Softwood plywood exports should also exhibit some growth, increasing from 0.8 million cbm to 1.9 million cbm during that period. Interregional exports of reconstituted panels are not expected to change significantly because local supplies of residual materials are sufficient to meet the needs of most regions.

2.3 OTHER INDUSTRIAL WOOD PRODUCTS

World demand for other industrial wood products is projected to be almost static during the balance of the century. Compared with an estimated consumption of 150 million cbm in 1980, consumption in 2000 is projected to be only 156 million. Softwood products are actually expected to decline during that period, falling from 68.5 million cbm to 67.7 million cbm. Hardwood products should show only nominal growth, rising 0.4% per year from 81.5 million cbm to 88.3 million cbm. Interregional trade of these products is expected to be minimal. Tables 2.3.1 and 2.3.2 show consumption and production numbers for softwoods and hardwoods respectively.

2.4 WOOD PULPS

Consumption estimates of fiber for wood pulps have been developed by the Working Party by estimating each producing region's fiber consumption by pulp category. To make this assessment, it has been necessary to estimate both fiber yield and pulp production by fiber type. The Working Party has used the scant regional data which is available about conversion factors in establishing its yield relationships and trends.

Pulp production has been estimated using the consumption and production data available from Phases II and III. Consumption growth estimates for the 1980-90 period have been extrapolated forward to create an outlook for 2000. Self-sufficiency has been based on interregional trade patterns and trends plus an assessment of future fiber availability. The split between softwood and hardwood fiber consumption for each pulp type has been established using the Working Party's best estimate of historical relationships, potential technology changes, relative economics and future supply.

The Working Party notes that the statistical section for fiber consumption by product type is speculative. Even the historical "statistics" are only estimates for most pulp grades and regions. The split between softwood and hardwood fibers by product type is the Working Party's creation. The statistics to support this breakdown are not known to exist. The reader is therefore advised to consider the historical statistics presented in the tables as best estimates by an informed Working Party, but to recognize that some substantive differences could exist between those estimates and actual fiber consumption by product.

Wood pulp products represent the major growth area for wood fibers. Consumption of wood fibers for pulp is projected to rise from 227.5 million cbm in 1960 to 511.5 million cbm in 1980 and 894.6 million cbm in 2000. This represents annual increases of 4.1% and 2.8% during the 1960-80 and 1980-2000 periods respectively. Softwoods are expected to continue constituting the bulk of pulp fibers, but their share is projected to fall from 82% of furnish in 1960 to 74% in 1980 and 71% in 2000. The underlying reason for this projected decline of softwood's share is the emerging world shortage of economically accessible softwoods, coupled with the industry's growing capability to utilize hardwoods. Tables 2.4.1 and 2.4.2 show the estimated consumption of softwood and hardwood fibers for pulps by geographic region. Tables 2.4.3 through 2.4.6 show the Working Party's estimate for world consumption of pulp by product and the estimated fiber usage for each pulp type. The reader is also referred to Appendix II which contains tables for pulp by region in fiber volume and metric tons.

Regional self-sufficiency in white chemical pulps has already been covered in Phase III for the 1973-90 period. The Working Party has used the projected supply trends for that period as a basis for estimating the 1990-2000 trade in white pulp. Interregional shipments of white pulp are projected to continue rising, exceeding 10 million tons by the turn of the century. Compared with an estimated 8.0% for 1980, interregional white pulp shipments are expected to reach 12.1% by 2000.

There is little historical interregional trade in other pulp products and no significant change is foreseen. The Working Party's estimates for trade by product are discussed in the individual country sections.

Table 2.0

WORLD

OUTLOOK FOR WOOD PRODUCTS

(Millions of Cubic Meters)

	1960		1970		1980		1990		2000	
Softwood	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.
Sawnwood & Sleepers	252.1	252.1	300.6	300.6	329.5	329.5	368.6	368.6	399.4	399.4
Solidwood Panels	10.0	10.0	18.7	18.7	24.3	24.3	30.6	30.6	34.5	34.5
Reconstituted Panels	12.0	12.0	35.0	35.0	61.4	61.4	81.0	81.0	100.7	100.7
Other Ind. Products	74.4	74.4	66.9	66.9	68.5	68.5	67.7	67.7	67.7	67.7
Pulps	187.6	187.6	314.0	314.0	379.5	379.5	477.3	477.3	631.0	631.0
TOTAL SOFTWOOD	536.1	536.1	735.2	735.2	863.2	863.2	1025.1	1025.1	1233.3	1233.3
Hardwood										
Sawnwood & Sleepers	73.5	73.5	91.2	91.2	99.3	99.3	123.9	123.9	143.1	143.1
Solidwood Panels	6.8	6.8	17.3	17.3	24.1	24.1	29.6	29.6	35.0	35.0
Reconstituted Panels	7.2	7.2	19.9	19.9	32.9	32.9	44.1	44.1	55.2	55.2
Other Ind. Products	69.4	69.4	77.3	77.3	81.5	81.5	83.6	83.6	88.3	88.3
Pulps	39.8	39.8	91.7	91.7	132.0	132.0	187.1	187.1	263.6	263.6
TOTAL HARDWOOD	196.7	196.7	297.4	297.4	369.8	369.8	468.3	468.3	585.2	585.2
Total Softwood & Hardwood										
Sawnwood & Sleepers	325.6	325.6	391.8	391.8	428.8	428.8	492.5	492.5	542.5	542.5
Solidwood Panels	16.8	16.8	36.0	36.0	48.4	48.4	60.2	60.2	69.5	69.5
Reconstituted Panels	19.2	19.2	54.9	54.9	94.3	94.3	125.1	125.1	155.9	155.9
Other Ind. Products	143.8	143.8	144.2	144.2	150.0	150.0	151.3	151.3	156.0	156.0
Pulps	227.5	227.5	405.7	405.7	511.5	511.5	664.4	664.4	894.6	894.6
TOTAL	732.8	732.8	1032.6	1032.6	1233.0	1233.0	1493.4	1493.4	1818.5	1818.5

Table 2.1.1

WORLD OUTLOOK FOR SOFTWOOD SAWNWOOD & SLEEPERS

(Fiber Volume, Millions of Cubic Meters)

	1960		1970		1980		1990		2000	
	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.
Canada	5.8	13.2	7.2	19.9	10.3	30.5	11.8	36.9	13.8	40.2
United States	56.1	50.4	62.2	52.8	69.5	53.9	75.4	53.9	76.3	54.8
NORTH AMERICA	61.9	63.6	69.4	72.7	79.8	84.4	87.2	90.8	90.1	95.0
France	5.1	5.0	7.2	5.7	7.4	5.6	8.1	5.6	8.9	5.7
West Germany	9.3	6.3	11.1	7.9	11.4	8.5	12.4	8.9	13.1	9.1
United Kingdom	8.0	0.4	8.5	0.5	7.6	0.8	8.0	0.9	8.2	1.1
Other EEC Countries	7.8	1.6	9.8	1.6	10.0	1.7	10.7	1.7	11.5	1.8
Nordic Countries	7.1	16.7	9.6	21.1	9.7	22.4	10.0	23.9	10.2	24.8
Other Western Europe	6.5	9.5	11.0	13.3	13.8	16.0	15.9	17.8	17.0	18.7
WESTERN EUROPE	43.8	39.5	57.2	50.1	59.9	55.0	65.1	58.8	69.0	61.2
JAPAN	21.6	21.4	34.8	32.5	37.1	34.3	45.6	42.1	48.5	44.4
LATIN AMERICA	5.3	5.5	7.5	7.8	6.9	6.9	7.3	8.3	9.0	11.5
Oceania	2.9	2.3	3.0	2.7	3.7	3.3	4.4	4.3	5.2	8.0
Middle East & N. Africa	1.7	0.3	2.4	0.4	3.0	0.4	3.9	0.5	5.0	0.7
Africa South of the Sahara	1.1	.7	1.7	1.4	2.0	2.0	2.8	2.8	3.7	3.5
Far East	1.0	1.0	1.9	2.0	2.3	2.6	3.3	3.5	4.5	4.7
OTHER E. HEMISPHERE	6.7	4.3	9.0	6.5	11.0	8.3	14.4	11.1	18.4	16.9
Eastern Europe	15.8	15.6	15.1	15.0	18.0	17.0	20.2	18.5	23.3	19.7
U.S.S.R.	89.0	94.1	97.2	105.5	103.4	110.2	111.7	122.2	120.5	130.7
Centrally Planned Asia	8.0	8.1	10.4	10.5	13.5	13.4	17.1	16.7	20.6	20.1
CENTRALLY PLANNED	112.8	117.8	122.7	131.0	134.9	140.6	149.0	157.4	164.4	170.5
WORLD	252.1	252.1	300.6	300.6	329.5	329.5	368.6	368.6	399.4	399.4

Table 2.1.2

WORLD OUTLOOK FOR HARDWOOD SAWNWOOD & SLEEPERS

(Fiber Volume, Millions of Cubic Meters)

	1960		1970		1980		1990		2000	
	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.
Canada	0.7	0.8	0.8	0.8	1.2	1.2	1.4	1.4	1.6	1.6
United States	11.7	11.4	14.2	13.7	12.3	12.3	12.8	12.8	13.1	13.0
NORTH AMERICA	12.4	12.2	15.0	14.5	13.5	13.5	14.2	14.2	14.7	14.6
France	2.7	3.2	3.8	4.0	4.1	4.3	4.6	4.9	5.1	5.4
West Germany	1.9	1.7	2.5	2.2	2.6	2.2	3.0	2.3	3.2	2.5
United Kingdom	2.3	0.8	1.4	0.7	1.2	0.4	1.3	0.3	1.4	0.3
Other EEC Countries	2.6	2.0	4.2	2.7	4.0	2.0	4.4	1.8	4.8	2.0
Nordic Countries	0.5	0.4	0.5	0.4	0.5	0.3	0.5	0.3	0.6	0.3
Other Western Europe	2.1	2.4	3.1	3.4	4.5	4.6	5.2	5.3	5.7	5.9
WESTERN EUROPE	12.1	10.5	15.5	13.4	16.9	13.8	19.0	14.9	20.8	16.4
JAPAN	4.9	5.1	9.3	9.0	7.5	7.1	6.4	5.5	5.3	4.3
LATIN AMERICA	6.7	6.8	8.0	8.3	10.3	10.4	14.7	14.9	17.8	18.2
Oceania	3.3	3.1	3.2	2.9	3.1	2.7	2.6	2.6	2.3	2.5
Middle East & N. Africa	0.3	0.1	0.6	0.3	0.6	0.2	0.6	0.2	0.8	0.2
Africa South of the Sahara	1.5	1.8	2.6	2.9	4.0	4.2	5.6	5.7	7.0	7.2
Far East	6.8	7.8	10.0	12.2	15.2	18.3	29.8	34.0	40.1	44.3
OTHER E. HEMISPHERE	11.9	12.8	16.4	18.3	22.9	25.4	38.6	42.5	50.2	54.2
Eastern Europe	3.7	4.2	5.1	5.8	5.8	6.5	7.1	7.1	7.5	8.1
U.S.S.R.	16.6	16.6	15.3	15.3	14.4	14.5	14.9	14.9	15.5	15.5
Centrally Planned Asia	5.2	5.2	6.6	6.6	8.0	8.2	9.6	9.9	11.3	11.7
CENTRALLY PLANNED	25.5	26.0	27.0	27.7	28.2	29.2	31.0	31.9	34.3	35.3
WORLD	73.5	73.5	91.2	91.2	99.3	99.3	123.9	123.9	143.1	143.1

Table 2.2.1

WORLD OUTLOOK FOR SOFTWOOD SOLIDWOOD PANELS

(Fiber Volume, Millions of Cubic Meters)

	1960		1970		1980		1990		2000	
	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.
Canada	0.7	0.8	1.5	1.8	2.3	2.3	2.9	3.0	3.4	3.8
United States	7.3	7.5	13.5	13.5	17.1	17.5	20.9	20.9	22.1	22.1
NORTH AMERICA	8.0	8.3	15.0	15.3	19.4	19.8	23.8	23.9	25.5	25.9
France	-	-	0.1	0.1	0.2	0.1	0.3	0.1	0.4	0.2
West Germany	0.2	0.2	0.3	0.2	0.4	0.2	0.4	0.2	0.5	0.2
United Kingdom	0.1	-	0.3	-	0.3	-	0.4	-	0.5	-
Other EEC Countries	0.1	-	0.1	0.1	0.3	-	0.2	0.1	0.4	-
Nordic Countries	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.2	0.3	0.3
Other Western Europe	-	-	0.1	0.1	0.1	0.1	0.2	0.1	0.3	0.1
WESTERN EUROPE	0.5	0.3	1.0	0.7	1.5	0.6	1.8	0.7	2.4	0.7
JAPAN	-	-	-	-	-	-	0.7	0.7	1.5	1.2
LATIN AMERICA	0.1	0.1	0.3	0.3	0.4	0.4	0.6	0.6	0.9	0.9
Oceania	-	-	-	-	0.1	0.1	0.1	0.1	0.1	0.2
Middle East & N. Africa	-	-	-	-	-	-	-	-	0.1	-
Africa South of the Sahara	-	-	-	-	-	-	-	-	-	-
Far East	-	-	-	-	-	-	-	-	-	-
OTHER E. HEMISPHERE	-	-	-	-	0.1	0.1	0.1	0.1	0.2	0.2
Eastern Europe	0.2	0.2	0.3	0.3	0.4	0.3	0.5	0.4	0.6	0.5
U.S.S.R.	1.1	1.1	2.0	2.0	2.3	2.8	2.8	3.8	3.1	4.7
Centrally Planned Asia	-	-	0.1	0.1	0.2	0.2	0.3	0.3	0.3	0.3
CENTRALLY PLANNED	1.3	1.3	2.4	2.4	2.9	3.3	3.6	4.5	4.0	5.5
WORLD	10.0	10.0	18.7	18.7	24.3	24.3	30.6	30.6	34.5	34.5

Table 2.2.2

WORLD OUTLOOK FOR HARDWOOD SOLIDWOOD PANELS

(Fiber Volume, Millions of Cubic Meters)

	1960		1970		1980		1990		2000	
	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.
Canada	0.2	0.2	0.5	0.5	0.9	0.7	1.1	0.8	1.3	0.9
United States	1.5	0.7	3.2	1.1	4.0	1.0	4.1	1.0	4.2	1.0
NORTH AMERICA	1.7	0.9	3.7	1.6	4.9	1.7	5.2	1.8	5.5	1.9
France	0.3	0.4	0.7	0.7	0.7	0.7	0.9	0.7	0.9	0.6
West Germany	0.7	0.7	0.7	0.8	0.8	0.6	1.1	0.6	1.0	0.6
United Kingdom	0.5	-	0.9	-	0.9	-	0.9	-	1.1	-
Other EEC Countries	0.5	0.5	0.8	0.7	1.4	0.7	1.5	0.7	1.6	0.5
Nordic Countries	0.1	0.3	0.2	0.6	0.3	0.5	0.5	0.5	0.5	0.4
Other Western Europe	0.4	0.4	0.9	0.9	1.0	1.1	1.3	1.3	1.5	1.4
WESTERN EUROPE	2.5	2.3	4.2	3.7	5.1	3.6	6.2	3.8	6.6	3.5
JAPAN	1.1	1.5	6.4	6.6	7.3	6.8	6.9	4.3	6.5	3.6
LATIN AMERICA	0.3	0.3	0.5	0.6	1.3	1.4	2.5	2.7	4.4	4.7
Oceania	0.1	0.1	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3
Middle East & N. Africa	0.1	-	0.2	0.2	1.0	0.4	1.8	1.1	2.5	1.6
Africa South of the Sahara	-	0.2	0.3	0.6	0.8	1.1	1.5	1.9	1.9	2.4
Far East	0.2	0.6	0.5	2.1	1.6	6.6	2.8	10.5	4.4	13.2
OTHER E. HEMISPHERE	0.4	0.9	1.2	3.1	3.6	8.3	6.4	13.8	9.1	17.5
Eastern Europe	0.6	0.6	0.7	0.8	1.1	1.0	1.3	1.3	1.6	1.5
U.S.S.R.	0.1	0.1	0.3	0.6	0.4	0.9	0.5	1.3	0.5	1.5
Centrally Planned Asia	0.2	0.2	0.3	0.3	0.4	0.4	0.6	0.6	0.8	0.8
CENTRALLY PLANNED	0.9	0.9	1.3	1.7	1.9	2.3	2.4	3.2	2.9	3.8
WORLD	6.8	6.8	17.3	17.3	24.1	24.1	29.6	29.6	35.0	35.0

Table 2.2.3

WORLD OUTLOOK FOR SOFTWOOD RECONSTITUTED PANELS

(Fiber Volume, Millions of Cubic Meters)

	1960		1970		1980		1990		2000	
	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.
Canada	0.5	0.5	1.0	1.0	1.8	1.6	2.3	2.3	3.2	3.0
United States	5.2	5.0	12.1	11.9	19.2	19.2	22.9	22.9	24.8	24.8
NORTH AMERICA	5.7	5.5	13.1	12.9	21.0	20.8	25.2	25.2	28.0	27.8
France	0.3	0.3	1.3	1.3	2.1	1.7	2.8	2.5	3.6	3.1
West Germany	1.1	0.9	3.9	3.6	6.1	6.0	8.1	7.7	10.3	9.3
United Kingdom	1.2	0.2	1.4	0.3	2.3	0.8	2.9	1.2	3.8	1.6
Other EEC Countries	0.4	0.3	2.0	2.2	3.7	3.9	5.0	4.3	6.6	4.7
Nordic Countries	1.1	2.6	2.0	3.7	2.8	4.6	3.3	5.4	4.0	7.6
Other Western Europe	0.4	0.4	1.7	1.8	3.3	4.0	4.7	6.1	6.6	10.0
WESTERN EUROPE	4.5	4.7	12.3	12.9	20.3	21.0	26.8	27.2	34.9	36.3
JAPAN	0.2	0.2	0.7	0.6	2.4	2.4	5.7	5.7	8.9	8.9
LATIN AMERICA	0.1	0.1	0.5	0.5	0.9	0.9	1.1	1.3	1.4	1.5
Oceania	0.1	0.1	0.7	0.6	1.4	1.4	1.7	1.7	2.0	2.0
Middle East & N. Africa	-	-	-	-	-	-	-	-	-	-
Africa South of the Sahara	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.3	0.3
Far East	-	-	-	-	-	-	-	-	-	-
OTHER E. HEMISPHERE	0.2	0.2	0.8	0.7	1.6	1.6	1.9	1.9	2.3	2.3
Eastern Europe	0.5	0.5	2.6	2.4	5.2	4.6	6.8	6.1	8.6	7.3
U.S.S.R.	0.4	0.4	4.3	4.3	9.0	9.1	11.8	11.9	14.1	14.1
Centrally Planned Asia	0.4	0.4	0.7	0.7	1.0	1.0	1.7	1.7	2.5	2.5
CENTRALLY PLANNED	1.3	1.3	7.6	7.4	15.2	14.7	20.3	19.7	25.2	23.9
WORLD	12.0	12.0	35.0	35.0	61.4	61.4	81.0	81.0	100.7	100.7

Table 2.2.4

WORLD OUTLOOK FOR HARDWOOD RECONSTITUTED PANELS

(Fiber Volume, Millions of Cubic Meters)

	1960		1970		1980		1990		2000	
	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.
Canada	0.4	0.4	0.8	0.9	1.7	1.6	2.6	2.6	3.5	3.4
United States	3.1	3.1	5.1	5.0	6.9	6.9	9.1	9.1	12.0	12.0
NORTH AMERICA	3.5	3.5	5.9	5.9	8.6	8.5	11.7	11.7	15.5	15.4
France	0.3	0.4	1.2	1.2	1.7	2.7	2.2	4.8	2.6	7.0
West Germany	0.7	0.6	2.6	2.5	4.1	3.8	5.5	4.0	6.8	4.4
United Kingdom	0.2	-	0.5	0.2	1.0	0.3	1.5	0.2	1.9	0.2
Other EEC Countries	0.7	0.4	2.0	1.8	3.2	3.0	4.1	2.9	5.0	3.0
Nordic Countries	0.2	0.4	0.5	0.9	1.2	1.7	1.5	2.9	1.8	3.7
Other Western Europe	0.2	0.3	1.1	1.2	2.2	2.8	3.3	4.1	4.3	3.8
WESTERN EUROPE	2.3	2.1	7.9	7.8	13.4	14.3	18.1	18.9	22.4	22.1
JAPAN	0.5	0.5	1.9	1.7	2.6	2.6	2.7	2.7	2.9	2.9
LATIN AMERICA	0.1	0.1	0.8	0.9	1.4	1.3	2.0	2.1	2.3	2.3
Oceania	0.1	0.2	0.1	0.2	0.3	0.3	0.3	0.3	0.3	0.3
Middle East & N. Africa	-	-	0.3	0.3	0.6	0.3	0.9	0.5	1.1	0.9
Africa South of the Sahara	0.1	0.1	0.3	0.4	0.8	0.7	1.1	1.1	1.5	1.9
Far East	0.1	0.1	0.3	0.3	0.4	0.4	0.4	0.4	0.6	0.6
OTHER E. HEMISPHERE	0.3	0.4	1.0	1.2	2.1	1.7	2.7	2.3	3.5	3.7
Eastern Europe	0.2	0.3	1.3	1.3	2.9	2.6	3.9	3.4	4.9	5.1
U.S.S.R.	0.2	0.2	0.5	0.5	1.1	1.1	1.6	1.6	1.9	1.9
Centrally Planned Asia	0.1	0.1	0.6	0.6	0.8	0.8	1.4	1.4	1.8	1.8
CENTRALLY PLANNED	0.5	0.6	2.5	2.4	4.8	4.5	6.9	6.4	8.6	8.8
WORLD	7.2	7.2	19.9	19.9	32.9	32.9	44.1	44.1	55.2	55.2

Table 2.2.5

WORLD OUTLOOK FOR RECONSTITUTED PANELS

(Product Volume, Millions of Cubic Meters)

	1960		1970		1980		1990		2000	
	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.
Canada	0.6	0.6	1.1	1.1	2.0	1.9	2.8	2.7	3.7	3.5
United States	5.2	5.1	10.1	9.9	14.7	14.7	17.7	17.7	20.1	20.2
NORTH AMERICA	5.8	5.7	11.2	11.0	16.7	16.6	20.5	20.4	23.8	23.7
France	0.4	0.4	1.7	1.7	2.7	3.0	3.5	5.2	4.3	7.0
West Germany	1.3	1.0	4.5	4.2	7.2	6.9	9.6	8.3	12.2	9.7
United Kingdom	0.8	0.2	1.2	0.4	2.3	0.8	3.2	1.0	4.0	1.3
Other EEC Countries	0.8	0.6	2.8	2.9	4.9	4.9	6.5	5.2	8.3	5.4
Nordic Countries	0.6	1.6	1.6	2.7	2.5	4.0	3.1	5.5	3.8	7.5
Other Western Europe	0.4	0.5	1.9	2.1	3.9	4.7	5.6	7.2	7.6	9.8
WESTERN EUROPE	4.3	4.3	13.7	14.0	23.5	24.3	31.5	32.4	40.2	40.7
JAPAN	0.4	0.4	1.6	1.4	3.1	3.1	5.2	5.2	7.3	7.3
LATIN AMERICA	0.1	0.1	0.8	0.8	1.4	1.4	1.8	2.0	2.3	2.5
Oceania	0.1	0.1	0.5	0.5	1.1	1.1	1.3	1.3	1.5	1.5
Middle East & N. Africa	-	-	0.1	0.1	0.4	0.2	0.6	0.3	0.7	0.5
Africa South of the Sahara	0.1	0.1	0.2	0.2	0.5	0.5	0.9	0.8	1.1	1.4
Far East	-	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.4	0.4
OTHER E. HEMISPHERE	0.2	0.3	0.9	0.9	2.2	2.0	3.0	2.6	3.7	3.8
Eastern Europe	0.6	0.6	2.9	2.9	5.8	5.2	7.8	7.1	9.7	9.1
U.S.S.R.	0.3	0.3	3.0	3.0	6.5	6.5	8.6	8.6	10.3	10.3
Centrally Planned Asia	0.3	0.3	0.8	0.8	1.2	1.2	2.0	2.0	2.7	2.7
CENTRALLY PLANNED	1.2	1.2	6.7	6.7	13.5	12.9	18.4	17.7	22.7	22.1
WORLD	12.0	12.0	34.9	34.9	60.3	60.3	80.3	80.3	100.0	100.1

Table 2.3.1

WORLD OUTLOOK FOR SOFTWOOD OTHER INDUSTRIAL PRODUCTS

(Fiber Volume, Millions of Cubic Meters)

	1960		1970		1980		1990		2000	
	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.
Canada	1.2	1.5	1.1	1.3	1.4	1.4	1.4	1.4	1.4	1.4
United States	9.5	9.3	7.8	7.1	7.4	7.4	7.5	7.5	7.5	7.5
NORTH AMERICA	10.7	10.8	8.9	8.4	8.8	8.8	8.9	8.9	8.9	8.9
France	1.0	1.3	0.8	0.8	0.6	0.6	0.8	0.7	0.9	0.8
West Germany	3.2	2.6	1.8	1.9	1.4	1.4	1.3	1.3	1.1	1.0
United Kingdom	1.2	0.4	0.5	0.2	0.4	0.2	0.4	0.2	0.6	0.3
Other EEC Countries	1.4	1.3	1.9	1.5	1.1	0.1	0.6	0.6	0.5	0.5
Nordic Countries	2.9	4.2	1.1	1.5	0.9	0.9	0.6	0.7	0.6	0.8
Other Western Europe	3.8	4.0	3.5	2.8	3.5	3.5	3.3	3.3	3.1	3.1
WESTERN EUROPE	13.5	13.8	9.6	8.7	7.9	7.7	7.0	6.8	6.8	6.5
JAPAN	3.4	3.3	1.6	1.4	1.1	1.1	1.0	1.0	1.0	1.0
LATIN AMERICA	0.3	0.3	0.6	0.6	0.7	0.7	0.9	0.9	1.0	1.0
Oceania	0.1	0.1	0.4	0.4	0.5	0.5	0.4	0.4	0.4	0.4
Middle East & N. Africa	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Africa South of the Sahara	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2
Far East	0.8	0.8	0.8	0.8	0.9	0.9	1.1	1.1	1.4	1.4
OTHER E. HEMISPHERE	1.2	1.2	1.5	1.5	1.8	1.8	1.9	1.9	2.2	2.2
Eastern Europe	6.5	6.1	8.0	7.7	8.0	7.5	7.7	7.3	7.6	7.1
U.S.S.R.	30.4	30.5	26.4	28.3	26.9	27.6	26.8	27.4	26.4	27.2
Centrally Planned Asia	8.4	8.4	10.3	10.3	13.3	13.3	13.5	13.5	13.8	13.8
CENTRALLY PLANNED	45.3	45.0	44.7	46.3	48.2	48.4	48.0	48.2	47.8	48.1
WORLD	74.4	74.4	66.9	66.9	68.5	68.5	67.7	67.7	67.7	67.7

Table 2.3.2

WORLD OUTLOOK FOR HARDWOOD OTHER INDUSTRIAL PRODUCTS

(Fiber Volume, Millions of Cubic Meters)

	1960		1970		1980		1990		2000	
	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.
Canada	-	-	-	-	-	-	-	-	-	-
United States	9.9	9.7	6.5	6.3	6.3	6.3	6.4	6.4	6.5	6.5
NORTH AMERICA	9.9	9.7	6.5	6.3	6.3	6.3	6.4	6.4	6.5	6.5
France	0.8	0.9	0.8	0.8	0.7	0.7	0.8	0.8	1.0	1.1
West Germany	2.5	2.4	1.2	1.1	1.2	1.2	1.0	1.0	0.9	0.9
United Kingdom	-	-	-	-	-	-	-	-	-	-
Other EEC Countries	0.9	0.8	1.7	1.9	0.9	0.9	0.5	0.5	0.4	0.4
Nordic Countries	0.7	0.8	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2
Other Western Europe	3.3	3.5	3.2	3.6	3.1	3.1	3.0	3.0	2.9	2.9
WESTERN EUROPE	8.2	8.4	7.2	7.7	6.1	6.1	5.5	5.5	5.4	5.5
JAPAN	1.9	1.8	0.9	0.8	0.2	0.1	0.2	0.1	0.2	0.1
LATIN AMERICA	2.6	2.7	5.7	5.7	6.8	6.8	8.1	8.1	9.5	9.5
Oceania	0.9	0.9	0.7	0.7	0.7	0.7	0.6	0.6	0.6	0.6
Middle East & N. Africa	5.7	5.6	6.0	5.8	6.3	6.2	6.3	6.2	6.4	6.2
Africa South of the Sahara	11.6	11.6	15.5	15.5	17.8	17.8	19.1	19.1	21.0	21.0
Far East	9.7	9.8	10.6	10.5	11.1	11.2	11.5	11.6	12.2	12.3
OTHER E. HEMISPHERE	27.9	27.9	32.8	32.5	35.9	35.9	37.5	37.5	40.2	40.1
Eastern Europe	5.1	5.1	5.7	5.8	5.7	5.7	6.2	6.2	6.8	6.8
U.S.S.R.	7.7	7.7	10.6	10.6	11.2	11.3	11.3	11.4	11.4	11.5
Centrally Planned Asia	6.1	6.1	7.9	7.9	9.3	9.3	8.4	8.4	8.3	8.3
CENTRALLY PLANNED	18.9	18.9	24.2	24.3	26.2	26.3	25.9	26.0	26.5	26.6
WORLD	69.4	69.4	77.3	77.3	81.5	81.5	83.6	83.6	88.3	88.3

Table 2.4.1

WORLD OUTLOOK FOR SOFTWOOD PULPS

(Fiber Volume, Millions of Cubic Meters)

	1960		1970		1980		1990		2000	
	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.
Canada	27.8	38.5	40.1	65.0	42.7	69.5	46.7	81.0	52.5	98.3
United States	76.4	69.2	119.3	110.3	132.7	122.4	154.0	140.2	184.4	167.6
NORTH AMERICA	104.3	107.7	159.4	175.3	175.4	191.9	200.7	221.2	236.9	265.9
France	5.9	2.7	8.6	4.4	10.6	5.8	12.2	7.5	14.2	9.6
West Germany	7.7	4.2	10.9	4.8	13.4	6.3	17.1	8.2	20.3	9.2
United Kingdom	7.3	0.8	8.5	0.9	8.2	0.7	8.9	0.7	9.5	2.9
Other EEC Countries	6.7	2.0	11.9	3.2	13.2	3.7	16.3	4.6	20.8	5.3
Nordic Countries	17.0	35.9	36.5	58.8	41.0	64.8	46.1	71.4	54.0	78.8
Other Western Europe	4.0	3.8	9.5	7.8	13.0	11.1	17.4	15.7	24.4	21.1
WESTERN EUROPE	48.6	49.4	85.8	79.9	99.4	92.4	118.0	108.1	143.2	126.9
JAPAN	8.5	7.7	15.7	12.0	22.3	19.5	34.2	28.1	52.1	40.8
LATIN AMERICA	3.0	1.4	6.7	4.3	9.1	7.8	17.4	19.0	33.8	36.8
Oceania	2.0	1.4	3.3	2.5	5.0	4.5	8.5	8.3	14.3	17.1
Middle East & N. Africa	0.1	-	0.4	-	0.7	-	1.8	-	3.2	0.8
Africa South of the Sahara	0.4	0.3	2.0	2.1	2.4	2.7	3.9	4.9	6.0	6.9
Far East	0.5	0.1	2.3	0.3	4.2	0.7	6.3	2.5	9.4	6.0
OTHER E. HEMISPHERE	2.9	1.8	7.9	4.9	12.3	7.9	20.5	15.7	32.8	30.8
Eastern Europe	6.5	5.9	9.4	8.3	16.3	12.9	23.9	14.5	37.1	15.6
U.S.S.R.	11.6	11.6	25.5	25.6	37.8	40.2	52.6	60.6	79.1	98.2
Centrally Planned Asia	2.2	2.2	3.7	3.7	6.9	6.9	10.1	10.1	16.0	16.0
CENTRALLY PLANNED	20.3	19.7	38.6	37.6	61.0	60.0	86.6	85.2	132.2	129.8
WORLD	187.6	187.6	314.0	314.0	379.5	379.5	477.3	477.3	631.0	631.0

Table 2.4.2

WORLD OUTLOOK FOR HARDWOOD PULPS

(Fiber Volume, Millions of Cubic Meters)

	1960		1970		1980		1990		2000	
	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.
Canada	1.1	1.6	2.1	4.4	4.4	7.1	5.6	8.2	7.4	9.3
United States	16.2	16.9	34.1	35.7	50.1	52.4	70.5	73.3	99.7	103.9
NORTH AMERICA	17.3	18.5	36.2	40.1	54.5	59.5	76.1	81.5	107.1	113.2
France	2.3	1.2	3.1	2.6	5.0	3.5	6.1	4.1	7.4	4.8
West Germany	2.3	1.1	3.6	1.3	4.9	1.3	6.2	1.8	8.3	2.2
United Kingdom	2.4	0.1	4.5	0.3	5.0	0.4	5.8	0.4	6.0	0.4
Other EEC Countries	2.1	0.8	4.4	1.7	5.1	2.4	8.2	3.1	11.3	4.1
Nordic Countries	1.7	7.1	5.7	12.2	6.8	13.4	9.4	14.8	12.7	17.1
Other Western Europe	1.2	1.1	4.6	4.6	7.4	8.0	9.9	11.7	11.9	18.0
WESTERN EUROPE	12.0	11.4	25.7	22.7	34.1	29.0	45.5	35.9	57.6	46.6
JAPAN	4.7	4.5	17.5	16.2	21.5	19.1	29.5	24.4	41.9	29.6
LATIN AMERICA	1.5	1.3	4.2	4.0	6.1	7.8	9.9	13.1	16.4	17.2
Oceania	0.5	0.4	0.8	0.6	1.1	0.8	1.8	2.3	3.2	5.0
Middle East & N. Africa	0.1	0.1	0.2	0.2	0.7	0.8	1.3	2.2	3.6	4.9
Africa South of the Sahara	-	-	0.5	1.4	1.3	2.3	1.8	4.7	2.7	9.8
Far East	0.2	0.1	0.7	0.5	3.1	3.1	5.2	7.0	10.2	16.8
OTHER E. HEMISPHERE	0.8	0.6	2.2	2.7	6.2	7.0	10.1	16.2	19.8	36.5
Eastern Europe	2.6	2.6	3.8	3.8	5.4	5.5	8.0	7.1	9.5	7.7
U.S.S.R.	-	-	0.9	0.9	2.5	2.5	5.1	5.9	7.0	8.5
Centrally Planned Asia	0.9	0.9	1.3	1.3	1.6	1.6	3.0	3.0	4.3	4.3
CENTRALLY PLANNED	3.5	3.5	6.0	6.0	9.5	9.6	16.1	16.0	20.8	20.5
WORLD	39.8	39.8	91.7	91.7	132.0	132.0	187.1	187.1	263.6	263.6

Table 2.4.3

WORLD OUTLOOK FOR MECHANICAL/SEMI-CHEMICAL PULP

(Fiber Volume, Millions of Cubic Meters)

	1960		1970		1980		1990		2000	
	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.
Canada	14.5	15.0	19.5	20.0	20.4	21.3	23.7	25.5	27.8	29.9
United States	14.0	13.6	20.7	20.3	27.3	26.4	39.2	38.9	62.3	62.3
NORTH AMERICA	28.5	28.6	40.2	40.3	47.7	47.7	62.9	64.4	90.1	92.2
France	1.5	1.3	2.1	1.7	2.6	2.3	3.4	3.0	4.4	4.2
West Germany	1.9	1.8	2.9	2.7	4.2	4.2	5.5	5.4	6.3	6.2
United Kingdom	2.5	0.7	2.2	0.8	1.8	0.8	2.2	0.8	2.6	1.4
Other EEC Countries	2.1	1.7	4.0	3.3	4.3	3.7	5.7	4.9	7.1	6.0
Nordic Countries	5.3	7.8	12.0	14.7	13.8	15.9	17.6	18.6	23.3	23.9
Other Western Europe	1.1	1.1	2.2	2.0	3.6	3.6	4.9	4.9	6.8	6.8
WESTERN EUROPE	14.4	14.4	25.2	25.2	30.2	30.5	39.2	37.6	50.5	48.5
JAPAN	2.9	2.9	7.0	7.0	8.9	8.9	13.0	13.0	19.0	19.0
LATIN AMERICA	0.7	0.6	1.3	1.3	2.3	2.2	4.8	4.9	10.6	10.6
Oceania	0.7	0.7	1.2	1.2	1.3	1.3	2.3	2.3	3.9	3.9
Middle East & N. Africa	-	-	0.1	-	0.2	-	0.4	0.4	0.9	0.9
Africa South of the Sahara	-	-	0.4	0.4	1.1	1.1	1.6	1.6	2.2	2.2
Far East	0.2	0.2	0.5	0.4	1.2	0.9	2.2	2.2	4.1	4.1
OTHER E. HEMISPHERE	0.9	0.9	2.1	2.0	3.7	3.3	6.5	6.5	11.1	11.1
Eastern Europe	1.4	1.4	2.3	2.3	3.5	3.6	5.3	4.5	7.9	5.2
U.S.S.R.	2.5	2.5	4.8	4.8	7.4	7.4	10.9	11.7	16.2	18.9
Centrally Planned Asia	0.5	0.5	1.5	1.5	2.7	2.7	4.2	4.2	6.7	6.7
CENTRALLY PLANNED	4.4	4.4	8.6	8.6	13.6	13.7	20.4	20.4	30.8	30.8
WORLD	51.8	51.8	84.4	84.4	106.3	106.3	146.8	146.8	212.2	212.2

Table 2.4.4

WORLD OUTLOOK FOR UNBLEACHED KRAFT

(Fiber Volume, Millions of Cubic Meters)

	1960		1970		1980		1990		2000	
	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.
Canada	3.4	4.3	5.0	6.5	7.7	8.6	9.4	10.2	11.2	12.3
United States	30.0	29.5	53.2	52.4	64.2	64.2	77.9	78.1	97.2	97.3
NORTH AMERICA	33.5	33.8	58.2	58.9	71.9	72.8	87.3	88.3	108.4	109.6
France	1.9	0.8	2.3	1.7	3.4	2.3	4.0	3.4	4.5	4.5
West Germany	1.0	-	0.9	-	0.9	-	1.3	-	1.8	-
United Kingdom	2.5	-	0.9	-	1.0	-	1.1	-	1.2	1.0
Other EEC Countries	1.0	0.1	1.3	0.2	1.8	0.2	2.3	0.2	2.8	0.2
Nordic Countries	7.1	12.6	13.6	18.2	15.8	20.3	17.7	22.1	19.2	22.8
Other Western Europe	1.0	0.9	2.5	2.4	3.9	4.2	5.7	6.3	7.6	8.9
WESTERN EUROPE	14.5	14.4	21.4	22.5	26.8	27.0	32.3	32.0	37.1	37.4
JAPAN	2.8	2.8	8.8	8.4	13.9	13.4	20.2	19.8	30.3	29.5
LATIN AMERICA	0.5	0.4	2.5	2.1	4.3	4.3	7.4	7.3	12.6	12.6
Oceania	0.6	0.6	1.2	1.1	2.3	2.3	4.3	4.3	8.0	8.0
Middle East & N. Africa	-	-	-	-	0.6	0.4	1.1	0.7	1.6	1.2
Africa South of the Sahara	-	-	0.9	1.3	1.1	1.8	1.5	2.1	2.3	2.7
Far East	0.1	-	1.0	0.2	2.2	1.1	3.2	2.8	5.6	5.6
OTHER E. HEMISPHERE	0.6	0.6	3.1	2.6	6.2	5.6	10.1	9.9	17.5	17.5
Eastern Europe	1.0	1.0	2.9	2.4	4.9	4.9	7.2	5.6	10.8	6.1
U.S.S.R.	3.6	3.6	8.8	8.8	14.8	14.8	21.8	23.2	33.1	37.1
Centrally Planned Asia	-	-	-	-	-	-	-	-	-	-
CENTRALLY PLANNED	4.6	4.6	11.7	11.2	19.7	19.7	29.0	28.8	43.9	43.2
WORLD	56.6	56.6	105.7	105.7	142.8	142.8	186.1	186.1	249.8	249.8

Table 2.4.5

WORLD OUTLOOK FOR WHITE PULP

(Fiber Volume, Millions of Cubic Meters)

	1960		1970		1980		1990		2000	
	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.
Canada	10.5	18.7	17.2	40.6	18.5	45.6	18.7	52.6	20.4	64.5
United States	43.4	37.6	72.9	65.2	86.8	78.0	102.9	91.1	120.0	106.5
NORTH AMERICA	53.9	56.3	90.1	105.8	105.3	123.6	121.6	143.7	140.4	171.0
France	3.7	1.4	6.5	3.0	9.0	4.3	10.3	4.8	12.0	5.3
West Germany	5.3	2.3	8.8	2.4	12.0	2.6	15.4	3.6	19.4	4.2
United Kingdom	3.1	0.2	7.8	0.4	8.9	0.3	10.0	0.3	10.3	0.9
Other EEC Countries	4.7	0.6	9.4	1.0	11.4	1.8	15.8	2.2	21.5	2.8
Nordic Countries	5.8	18.5	16.0	34.3	17.5	39.5	19.5	43.0	23.6	46.7
Other Western Europe	2.2	2.2	7.9	6.8	11.7	10.1	15.5	15.0	20.8	22.2
WESTERN EUROPE	24.8	25.2	56.3	47.9	70.5	58.6	86.5	68.9	107.6	82.1
JAPAN	4.7	4.7	13.4	10.6	19.3	15.4	29.4	19.2	43.9	21.5
LATIN AMERICA	3.3	1.7	6.6	4.9	7.9	8.7	14.3	19.5	26.2	30.4
Oceania	1.2	0.5	1.7	0.8	2.5	1.7	3.7	4.0	5.6	10.2
Middle East & N. Africa	0.2	0.1	0.4	0.2	0.5	0.4	1.5	1.1	4.1	3.6
Africa South of the Sahara	0.4	0.3	1.1	0.7	1.4	1.0	2.5	4.8	4.1	10.6
Far East	0.4	-	1.2	0.1	2.8	1.3	5.0	4.0	8.6	12.5
OTHER E. HEMISPHERE	2.2	0.9	4.4	1.8	7.3	4.4	12.7	13.9	22.4	36.9
Eastern Europe	5.0	5.0	5.6	5.4	10.3	7.6	16.3	9.0	24.6	9.3
U.S.S.R.	5.5	5.5	9.9	9.9	12.8	15.2	18.8	25.4	29.7	43.6
Centrally Planned Asia	2.6	2.6	3.5	3.5	5.8	5.8	8.9	8.9	13.6	13.6
CENTRALLY PLANNED	13.1	13.1	19.0	18.8	28.9	28.6	44.0	43.3	67.9	66.5
WORLD	101.9	101.9	189.8	189.8	239.3	239.3	308.5	308.5	408.4	408.4

Table 2.4.6

WORLD OUTLOOK FOR DISSOLVING PULP

(Fiber Volume, Millions of Cubic Meters)

	1960		1970		1980		1990		2000	
	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.
Canada	0.5	2.1	0.5	2.3	0.5	1.1	0.5	0.9	0.5	0.9
United States	5.2	5.4	6.6	8.1	4.5	6.2	4.5	5.4	4.6	5.4
NORTH AMERICA	5.7	7.5	7.1	10.4	5.0	7.3	5.0	6.3	5.1	6.3
France	1.1	0.4	0.8	0.6	0.6	0.4	0.6	0.4	0.7	0.4
West Germany	1.8	1.2	1.9	1.0	1.2	0.8	1.0	1.0	1.1	1.0
United Kingdom	1.6	-	2.1	-	1.5	-	1.3	-	1.4	-
Other EEC Countries	1.0	0.4	1.6	0.4	0.8	0.4	0.7	0.4	0.7	0.4
Nordic Countries	0.5	4.1	0.6	3.8	0.7	2.5	0.7	2.5	0.6	2.5
Other Western Europe	0.8	0.7	1.5	1.2	1.2	1.2	1.2	1.2	1.1	1.2
WESTERN EUROPE	6.9	6.8	8.5	7.0	6.0	5.3	5.5	5.5	5.6	5.5
JAPAN	2.8	1.8	3.9	2.2	1.7	0.9	1.1	0.5	0.8	0.4
LATIN AMERICA	-	-	0.5	-	0.7	0.4	0.8	0.4	0.8	0.4
Oceania	-	-	-	-	-	-	-	-	-	-
Middle East & N. Africa	-	-	0.1	-	0.1	-	0.1	-	0.1	-
Africa South of the Sahara	-	-	0.1	1.1	0.1	1.1	0.1	1.1	0.1	1.2
Far East	-	-	0.3	0.1	1.1	0.5	1.1	0.5	1.3	0.6
OTHER E. HEMISPHERE	-	-	0.5	1.2	1.3	1.6	1.3	1.6	1.5	1.8
Eastern Europe	1.7	1.1	2.4	2.0	3.0	2.3	3.1	2.5	3.3	2.7
U.S.S.R.	-	-	2.9	3.0	5.3	5.3	6.2	6.2	7.1	7.1
Centrally Planned Asia	-	-	-	-	-	-	-	-	-	-
CENTRALLY PLANNED	1.7	1.1	5.3	5.0	8.3	7.6	9.3	8.7	10.4	9.8
WORLD	17.2	17.2	25.8	25.8	23.1	23.1	23.0	23.0	24.2	24.2

NORTH AMERICA

3.0 NORTH AMERICA

North America consumes nearly one third of worldwide fiber volume. Consumption has grown at an annual rate of 2.6%, from 235.4 million cbm in 1960 to an estimated 392.2 million cbm in 1980. The annual rate of growth is projected to slow to 1 6% between now and 2000, with consumption reaching 538.7 million cbm at that time. Growth should slow for both the solidwood products and the pulp and reconstituted panel category. Solidwood products' share of total fiber consumption, however, is expected to decline from 36% in 1960 to 30% and 25% respectively in 1980 and 2000.

Consumption has been projected independently for the United States and Canada by product line. The Working Party has first developed housing forecasts based on anticipated demographic changes. Wood product usage per housing start has been forecast by considering housing mix and size as well as substitution of wood and non-wood products. For those products not directly related to housing, various economic factors such as population, industrial production, and GDP growth have been used to develop product consumption projections.

3.1 SAWNWOOD AND SLEEPERS

3.1.1 CANADA

Consumption of all sawnwood products in Canada is expected to rise from 6.5 million cbm in 1960 to an estimated 11.5 million cbm by 1980, an annual compound growth rate of 2.9%. From the 1980 level of 11.5 million cbm consumption of sawnwood products should increase to 15.4 million cbm representing an annual compound growth rate of 1.5% for the 1980-2000 period. Softwood sawnwood and sleepers constitute 90% of this category. They are projected to rise from 5.8 million cbm in 1960 to 10.3 million cbm in 1980 and 13.8 million cbm by the year 2000. Hardwood sawnwood and sleepers are projected to rise from 1.2 million cbm in 1980 to 1.6 million cbm in 2000.

The forecast methodology underlying these growth assumptions centers on the analysis of the historical relationship of consumption levels with economic growth indicators such as GDP and housing starts. These historical relationships have been adjusted to the extent that end use indicators such as type, size and usage factors of housing starts are forecasted to impact on total volume.

Canada is a net exporter of sawnwood products. Exports of softwood sawnwood should rise from 7.4 million cbm in 1960 to an estimated 20.2 million cbm in 1980. This increase in exports should continue to an estimated level of 26.4 million cbm in 2000. Canada has historically been only slightly in excess of 100% self-sufficient relative to its hardwood sawnwood requirements. Table 3.0.1 shows the Working Party's outlook for consumption and production of fiber products in Canada.

3.1.2 UNITED STATES

Consumption of sawnwood products in the United States is projected to rise to 89.4 million cbm in 2000 from a trend level of 81.8 million cbm in 1980. This 0.5% annual growth rate over the next 20 years is about one half the rate experienced in the 1960-80 period.

Softwood sawnwood accounts for 85% of the total and is expected to maintain that share through the year 2000. On trend, in 1980, an estimated 42% of the softwood sawnwood is forecast to be used in new housing. Due to demographic factors, United States housing starts are projected to increase for the next several years but peak in the 1985-90 time period. With little change expected in the size or mix of housing starts, and a continuing substitution of wood and non-wood products for lumber, softwood sawnwood used in new housing is projected to decline at an annual rate of 0.5% from 1980 to 1990 and 1.4% between 1990 and 2000. This compares to an estimated growth of 1% annually from 1960 to 1980.

Softwood used for other than new housing is projected to grow at an annual rate of 1.4% compared to the 0.8% rate between 1960 and 1980.

Hardwood sawnwood, 15% of total sawnwood, is projected to rise to 13.1 million cbm in 2000 from a trend level of 12.3 million cbm in 1980. This growth rate of 0.3% annually is virtually unchanged from the growth during the 1960-80 period.

The United States is a net importer of sawnwood products. Softwood sawnwood imports, nearly all from Canada, are projected to rise to 21.5 million cbm in 2000 from the 1980 trend of 15.6 million cbm. Softwood sawnwood imports have increased from 10% of domestic consumption in 1960 to 22% in 1980 and are projected to rise to 28% of consumption in 2000. The United States which historically has imported 2 to 3% of its hardwood sawnwood consumption is expected to be self-sufficient in the future. The United States outlook for production and consumption of fiber products is shown in Table 3.0.2.

3.2 PANEL PRODUCTS

3.2.1 CANADA

Consumption of panelboard products in Canada is expected to rise from an estimated 1.8 million cbm of fiber volume in 1960 to 6.7 million cbm by 1980 and 11.4 million cbm in the year 2000. Their growth is projected at a 2.7% annual rate between 1980 and 2000. Plywood represents the single largest component of panel products consumed in Canada, although its share of the total is forecast to decline from 50% of fiber volume in 1960 to 48% in 1980 and 41% in 2000. Particleboard is projected to grow at a greater rate than other panel products and comprise 39% of the total fiber volume by 2000, up from 28% in 1980.

Softwood plywood should continue to represent 80% of all plywood consumed in 2000. Softwood particleboard is forecast to account for 40% of all particleboard by 2000, a decrease of 5% from 1980. Softwood fiberboard is also projected to decline, down 5% to 54% of all fiberboard consumed by 2000.

Canada is expected to remain a net exporter of softwood plywood and virtually self-sufficient in particleboard and fiberboard. It should, however, have to import about 58% of its hardwood plywood consumption over the forecast period.

3.2.2 UNITED STATES

Panel consumption in the United States is expected to reach 63.1 million cbm in 2000 from the trend level of 47.2 million cbm in 1980. This 1.5% annual growth rate of fiber volume compares to a 5.2% rate in the 1960-80 period.

New housing accounts for about one third of panel consumption. Much of the historical growth of panel products was the result of panel substitution for lumber in new housing as well as other construction and manufacturing uses. The rate of substitution should slow markedly in the 1980-2000 period. This slower rate of penetration along with the expected 1985-90 peak in new housing is largely responsible for the projected slowing of growth rates.

Plywood represented 51% of panel fiber volume in 1960. As reconstituted panels have replaced plywood in construction uses, the plywood share has declined to the current trend level of 45%. Based on an expected 1% average annual growth rate during the next two decades, plywood should account for about 42% of panel fiber volume in 2000. Softwood, now 83% of plywood consumed, is expected to represent 86% at that time.

Consumption of reconstituted panels has grown at an estimated 5.9% annual rate from 1960 to the current trend level of 25.8 million cbm. A 1.8% annual growth is projected during the next two decades; reconstituted products are expected to account for 58% of panel consumption by the year 2000, as a modest penetration of traditional plywood market continues. Official statistics for the fiber component of reconstituted panels are not available. The Working Party has, however, estimated the current hardwood portion of reconstituted products at approximately 27%. Assuming a relatively greater availability of hardwood supply, this share is projected to increase to about one third by 2000.

The trade pattern for panels in the United States is expected to shift for both reconstituted and solid-wood panels. It is expected that the United States will become self-sufficient in reconstituted panels in the 1980 to 2000 period after having imported an average 5% of domestic consumption. Historically, the United States has been a net exporter of softwood plywood. Due to softwood sawlog supply constraints, however, it is expected that production will be adequate for domestic needs only; self-sufficiency is thus projected at 100% for the 1985-2000 period.

3.3 OTHER INDUSTRIAL WOOD PRODUCTS

3.3.1 CANADA

Canada's consumption of other industrial wood products is projected to increase slightly from 1.2 to 1.4 million cbm in the period 1960-80. For the period 1980-2000 consumption is projected to remain constant as a slight continuing decline in miscellaneous industrial products is offset by a slight increase in the consumption of pitprops. In Canada, all pitprops and other industrial products are softwood, which is expected to continue for the 1980-2000 period.

Canada has been self-sufficient in pitprops and other industrial roundwood products. This relationship is not expected to change during the 1980-2000 period.

3.3.2 UNITED STATES

Consumption of other industrial products is projected at 14.0 million cbm in 2000, up only slightly from the trend level of 13.7 million cbm in 1980. Trend consumption of the miscellaneous products within this category is reported to have been as high as 19.4 million cbm in 1960 but since has fluctuated in the 13.5 to

14.5 million cbm range. No change is foreseen. Softwood products represent 55% of other industrial consumption and should continue near that level in the 1980-2000 period.

The United States has been self-sufficient in pitprops but has historically imported from 3% to 7% of its annual consumption of "other" industrial products. Imports are projected to be 0.4 to 0.5 million cbm in the 1980-2000 period and account for about 4% of domestic consumption.

3.4 WOOD PULPS

3.4.1 CANADA

Consumption of wood pulps in Canada is projected to increase from 28.9 million cbm in 1960 to an estimated 47.1 million cbm in 1980. This represents a compound growth rate of 2.5% per annum. Growth in consumption in the 1980-2000 period is estimated to rise to 59.9 million cbm in 2000, a compound growth rate of 1.2% per annum. The softwood share of fiber consumed is expected to decline from 97% in 1960 to 91% and 88%, respectively in 1980 and 2000. Tables 3.0.1 in Appendix II show the Working Party's estimates by product and fiber type.

Self-sufficiency for pulp fibers should continue to increase. Exports of baled pulps containing softwood fibers are estimated at 26.8 million cbm in 1980; they are projected to grow to 45.8 million cbm in 2000. At the same time hardwood fiber exports in pulp are forecast to decline to 1.9 million cbm in 2000 from the estimated 2.7 million cbm level in 1980. As noted in Section 1.6 the exports of fiber in paper products such as newsprint are not considered as expotts in calculating self-sufficiency.

3.4.2 UNITED STATES

United States consumption of fiber in wood pulps is estimated to increase from 86.1 million cbm in 1960 to 174.8 million cbm in 1980, a growth rate of 3.6% per annum. This growth rate is projected to decline to 2.2% per year over the next two decades.

Softwood fiber, which accounted for 80% of consumption in 1960, is expected to decline to 70% in 1980 and further to 62% by 2000. This projected large decline in share is a result of the anticipated softwood supply constraints over the next 20 years in the United States. In order to meet the projected pulp demand, the Working Party has estimated that hardwood would represent a growing portion of the fiber consumed in both unbleached kraft and white pulp. In 1960, unbleached kraft had no significant hardwood content; by 1980 hardwoods are estimated to account for 9% of fiber consumed and by 2000 to equal about 18%. Hardwoods accounted for about 33% of the fiber in white pulp produced in 1970; their share is projected to increase to 41% in 1980 and 55% by 2000. The softwood supply shortage is perceived by the Working Party to be so severe in the United States South during the 1990-2000 period that it has been forced to project that 15%-20% of the fiber in the South's bleached "softwood" kraft pulp will in fact be hardwood. The Working Party's assessment of fiber consumption and production by type of pulp is shown in Tables 3.0.2 and 3.0.2.1 of Appendix II.

TABLE 3.0

NORTH AMERICA

OUTLOOK FOR WOOD PRODUCTS

(Millions of Cubic Meters)

	1960		1970		1980		1990		2000	
	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.
Softwood										
Sawnwood & Sleepers	61.9	63.6	69.4	72.7	79.8	84.4	87.2	90.8	90.1	95.0
Solidwood Panels	8.0	8.3	15.0	15.3	19.4	19.8	23.8	23.9	25.5	25.9
Reconstituted Panels	5.7	5.5	13.1	12.9	21.0	20.8	25.2	25.2	28.0	27.8
Other Ind. Products	10.7	10.8	8.9	8.4	8.8	8.8	8.9	8.9	8.9	8.9
Pulps	104.3	107.7	159.4	175.3	175.4	191.9	200.7	221.2	236.9	265.9
TOTAL SOFTWOOD	190.6	195.9	265.8	284.6	304.4	325.7	345.8	370.0	389.4	423.5
Hardwood										
Sawnwood & Sleepers	12.4	12.2	15.0	14.5	13.5	13.5	14.2	14.2	14.7	14.6
Solidwood Panels	1.7	0.9	3.7	1.6	4.9	1.7	5.2	1.8	5.5	1.9
Reconstituted Panels	3.5	3.5	5.9	5.9	8.6	8.5	11.7	11.7	15.5	15.4
Other Ind. Products	9.9	9.7	6.5	6.3	6.3	6.3	6.4	6.4	6.5	6.5
Pulps	17.3	18.5	36.2	40.1	54.5	59.5	76.1	81.5	107.1	113.2
TOTAL HARDWOOD	44.8	44.8	67.3	68.4	87.8	89.5	113.6	115.6	149.3	151.6
Total Softwood & Hardwood										
Sawnwood & Sleepers	74.3	75.8	84.4	87.2	93.3	97.9	101.4	105.0	104.8	109.6
Solidwood Panels	9.7	9.2	18.7	16.9	24.3	21.5	29.0	25.7	31.0	27.8
Reconstituted Panels	9.2	9.0	19.0	18.8	29.6	29.3	36.9	36.9	43.5	43.2
Other Ind. Products	20.6	20.5	15.4	14.7	15.1	15.1	15.3	15.3	15.4	15.4
Pulps	121.6	126.2	195.6	215.4	229.9	251.4	276.8	302.7	344.0	379.1
TOTAL	235.4	240.7	333.1	353.0	392.2	415.2	459.4	485.6	538.7	575.1

TABLE 3.0.1

CANADA

OUTLOOK FOR WOOD PRODUCTS

(Millions of Cubic Meters)

	1960		1970		1980		1990		2000	
Softwood	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.
Sawnwood & Sleepers	5.8	13.2	7.2	19.9	10.3	30.5	11.8	36.9	13.8	40.2
Solidwood Panels	0.7	0.8	1.5	1.8	2.3	2.3	2.9	3.0	3.4	3.8
Reconstituted Panels	0.5	0.5	1.0	1.0	1.8	1.6	2.3	2.3	3.2	3.0
Other Ind. Products	1.2	1.5	1.1	1.3	1.4	1.4	1.4	1.4	1.4	1.4
Pulps	27.9	38.5	40.1	65.0	42.7	69.5	46.7	81.0	52.5	98.3
TOTAL SOFTWOOD	36.1	54.5	50.9	89.0	58.5	105.3	65.1	124.6	74.3	146.7
Hardwood										
Sawnwood & Sleepers	0.7	0.8	0.8	0.8	1.2	1.2	1.4	1.4	1.6	1.6
Solidwood Panels	0.2	0.2	0.5	0.5	0.9	0.7	1.1	0.8	1.3	0.9
Reconstituted Panels	0.4	0.4	0.8	0.9	1.7	1.6	2.6	2.6	3.5	3.4
Other Ind. Products	-	-	-	-	-	-	-	-	-	-
Pulps	1.1	1.6	2.1	4.4	4.4	7.1	5.6	8.2	7.4	9.3
TOTAL HARDWOOD	2.4	3.0	4.2	6.6	8.2	10.6	10.7	13.0	13.8	15.2
Total Softwood & Hardwood										
Sawnwood & Sleepers	6.5	14.0	8.0	20.7	11.5	31.7	13.2	38.3	15.4	41.8
Solidwood Panels	0.9	1.0	2.0	2.3	3.2	3.0	4.0	3.8	4.7	4.7
Reconstituted Panels	0.9	0.9	1.8	1.9	3.5	3.2	4.9	4.9	6.7	6.4
Other Ind. Products	1.2	1.5	1.1	1.3	1.4	1.4	1.4	1.4	1.4	1.4
Pulps	28.9	40.1	42.2	69.4	47.1	76.6	52.3	89.2	59.9	107.6
TOTAL	38.5	57.5	55.1	95.6	66.7	115.9	75.8	137.6	88.1	161.9

TABLE 3.0.2

UNITED STATES

OUTLOOK FOR WOOD PRODUCTS

(Millions of Cubic Meters)

	1960		1970		1980		1990		2000	
Softwood	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.
Sawnwood & Sleepers	56.1	50.4	62.2	52.8	69.5	53.9	75.4	53.9	76.3	54.8
Solidwood Panels	7.3	7.5	13.5	13.5	17.1	17.5	20.9	20.9	22.1	22.1
Reconstituted Panels	5.2	5.0	12.1	11.9	19.2	19.2	22.9	22.9	24.8	24.8
Other Ind. Products	9.5	9.3	7.8	7.1	7.4	7.4	7.5	7.5	7.5	7.5
Pulps	76.4	69.2	119.3	110.3	132.7	122.4	154.0	140.2	184.4	167.6
TOTAL SOFTWOOD	154.5	141.4	214.9	195.6	245.9	220.4	280.7	245.4	315.1	276.8
Hardwood										
Sawnwood & Sleepers	11.7	11.4	14.2	13.7	12.3	12.3	12.8	12.8	13.1	13.0
Solidwood Panels	1.5	0.7	3.2	1.1	4.0	1.0	4.1	1.0	4.2	1.0
Reconstituted Panels	3.1	3.1	5.1	5.0	6.9	6.9	9.1	9.1	12.0	12.0
Other Ind. Products	9.9	9.7	6.5	6.3	6.3	6.3	6.4	6.4	6.5	6.5
Pulps	16.2	16.9	34.1	35.7	50.1	52.4	70.5	73.3	99.7	103.9
TOTAL HARDWOOD	42.4	41.8	63.1	61.8	79.6	78.9	102.9	102.6	135.5	136.4
Total Softwood & Hardwood										
Sawnwood & Sleepers	67.8	61.8	76.4	66.5	81.8	66.2	88.2	66.7	89.4	67.8
Solidwood Panels	8.8	8.2	16.7	14.6	21.1	18.5	25.0	21.9	26.3	23.1
Reconstituted Panels	8.3	8.1	17.2	16.9	26.1	26.1	32.0	32.0	36.8	36.8
Other Ind. Products	19.4	19.0	14.3	13.4	13.7	13.7	13.9	13.9	14.0	14.0
Pulps	92.6	86.1	153.4	146.0	182.8	174.8	224.5	213.5	284.1	271.5
TOTAL	196.9	183.2	278.0	257.4	325.5	299.3	383.6	348.0	450.6	413.2

WESTERN EUROPE

4.0 WESTERN EUROPE

Western Europe is a highly industrialized region with extensive commercial forests and is therefore a major wood consumer. Until the late 1950's sawnwood products exceeded pulps as the major consumer of wood fiber. Sawnwood consumption has continued to grow since that time but at a slower rate than pulps. Despite the impetus provided into the early 1970's by post-war rebuilding and demographic factors, sawnwood consumption has grown less than half as rapidly as economic activity whereas consumption of pulp products has exceeded GDP growth.

To develop its consumption forecasts for Western Europe the Working Party has used a wide variety of techniques. Each country has been considered individually by a specialist in that country's industry. The forecasting methodology applied has varied but is often based on those demographic, housing, economic and supply factors perceived to be relevant.

The Working Party projects the growth rates of both sawnwood and pulps to decline. Pulp products, however, are expected to maintain a more vigorous growth. The fiber requirements for pulp consumption should grow at a 2.0% annual rate compared with only 0.8% for sawnwood and sleepers. Accordingly, their share of the region's total fiber consumption is expected to increase from 41% in 1960 to 51% and 54% in the years 1980 and 2000 respectively. Table 4.0 shows the Working Party's estimates for consumption by product category.

4.1 SAWNWOOD & SLEEPERS

Consumption of sawnwood and sleepers in Western Europe has grown at a relatively slow pace since 1960. The outlook for growth in consumption, however, is even slower. Compared with 55.9 million cbm in 1960 and an estimated 76.8 million cbm in 1980, consumption in 2000 is estimated to reach only 89.8 million cbm. This is equivalent to an 0.8% annual growth rate, much smaller than the 1.6% growth rate of the 1960-80 period.

Production of sawnwood is expected to grow at the same rate as consumption but from a lower base. Self-sufficiency has been as low as 84% in the early 1960's, but an 86-90% level is projected for the 1980-2000 period. Nonetheless, there should still be a large shortfall during this period. The Working Party projects that this deficit will rise from an estimated level of 8.0 million cbm in 1980 to about 12.2 million cbm by 2000. The composition of the sawnwood consumption shows a distinct dynamic: hardwood has replaced softwood in some applications while wooden sleepers are losing their former position:

	1960	1970	2000
Sawn softwood	77.5%	78.4%	77.1%
Sawn hardwood	18.9%	19.6%	21.8%
Sleepers	3.6%	2.0%	1.1%
	100.0%	100.0%	100.0%

Sawn softwood has been and is expected to continue as the most important sawn good in Western Europe. Its consumption in 1960 was 43.5 million cbm; it increased to 56.8 million cbm in 1970, an average annual rate of 2.7%. By the year 2000 it is expected to reach a level of 68 million cbm. This represents, however, a growth rate of only 0.6% per annum. Self-sufficiency first declined from 89.4% in 1960 to 86.7% in 1970, but should improve to 91.8% in 2000. The region's supply deficit of sawn softwood has risen from 4.6 million cbm in 1960 to 7.5 million cbm in 1970. It is expected to drop to the 5.0-6.0 million cbm range in the 1980's but return to the 8.0 million cbm level in 2000.

Sawn hardwood is, of course, less important than sawn softwood, but its consumption is growing at a somewhat more rapid pace. Compared with 10.6 million cbm in 1960, consumption of sawn hardwood products other than sleepers in 1980 is estimated to reach 15.9 million cbm, equivalent to a 2.0% annual growth rate. This pace is, however, expected to slow to a 1.2% rate during the following two decades, so that consumption should only reach the 20 million level by 2000. Self-sufficiency is expected to continue at current level of approximately 80% until 2000. The deficit is expected to grow from the current level of approximately 3.5 cbm to more than 4.0 cbm by that time.

Wooden Sleepers in Western Europe are produced from both hardwoods and softwoods although hardwoods are believed to predominate. Their consumption is declining rapidly due to the limited installation of new trackage and their increasing replacement by concrete or steel sleepers. Apparent consumption has recently dropped from almost 2 million cbm in 1960 to an estimated 1.1 million cbm in 1980. A further drop to the 0.9 million cbm level is foreseen by 2000. Self-sufficiency should improve as consumption declines and a modest level of exports may develop by year 2000.

4.1.1 FRANCE

Consumption of sawnwood in France is projected to show very little growth in the 1980-2000 period. Consumption of softwood and hardwood sawnwood are projected to rise only 1.0% per year during that period. This is down significantly from the decade of the 1960's when softwood sawnwood grew at a 3.6% rate. As in most European countries, consumption of sleepers is projected to continue its steep decline. Table 4.0.1 shows the projected outlook for France by product group.

France's self-sufficiency in sawnwood has been changing in recent years. It has become increasingly dependent on imports of softwood products. Of the 7.4 million cbm softwood sawnwood consumption projected for 1980, only 76% is expected to be produced in France; this is down from 98% of the 5.1 million cbm in 1960. Production is not expected to grow significantly between 1980 and 2000 as sawlog quality and quantity both limit domestic production. Thus softwood sawnwood self-sufficiency is estimated at about 64% of the 8.9 million cbm projected for 2000. The hardwood outlook is less unfavorable. France is expected to remain a net exporter of hardwood sawnwood and sleepers, but its export volume is expected to remain level from 1980 on. Compared with an estimated 119% self-sufficiency in 1960 the 1980 and 2000 levels are estimated at 103% and 106% respectively. Thus while total sawnwood consumption rises an estimated 6.2 million cbm from 7.8 to 14.0 in those four decades sawlog shortages are projected to restrict France's growth in production to a 2.9 million cbm increase up from 8.2 to 11.1 million cbm.

4.1.2 FEDERAL REPUBLIC OF GERMANY

As in most European Countries the big increase in sawnwood consumption, which followed World War II, has already lost most of its impetus in West Germany. Sawnwood consumption has grown only nominally since 1970. Total consumption in the 1980 to 2000 period is projected to grow at an 0.8% rate, rising from 14.0 to 16.3 million cbm. Hardwood sawnwood is expected to grow more rapidly than softwood, up 1.0% vs. 0.7% for softwood during that period. Table 4.0.2 shows the Working Party's projections for West Germany.

After rising from 71% in 1960 to 84% in 1975, self-sufficiency in West Germany is believed now to be falling. In 1980, only 10.7 million cbm or 76% of the country's consumption is expected to be from domestic mills. By 2000, production is estimated to reach 11.6 million cbm, but self-sufficiency will be even lower at 71%.

4.1.3 UNITED KINGDOM

Consumption of sawnwood in the United Kingdom has been declining for over a decade. During the 1960-70 period when most European countries experienced a 30% growth in sawnwood consumption, it declined in the United Kingdom, falling from 10.3 to 9.9 million cbm. This decline is expected to be arrested as domestic sawlog supply increases in the next two decades. Consumption in the year 2000, however, is estimated to remain below the 1970 level (see Table 4.0.3).

Softwood sawnwood represents the bulk of the United Kingdom's consumption yet over 90% is currently imported. The U.K.'s self-sufficiency in softwood sawnwood is projected to increase as the major afforestation projects in the North lead to increased sawlog supply. Nonetheless only 13% of the estimated 8.2 million cbm softwood sawnwood consumed in 2000 are expected to come from domestic mills. The outlook for hardwood sawnwood is also unfavorable. Self-sufficiency is expected to decline from the 1970 level of 50% to 21% by 2000.

4.1.4 OTHER EEC COUNTRIES

As regards total sawnwood consumption, the subregion "Other EEC Countries" follows very well the EEC average. This subregion has the average high standard of living which characterizes the demand outlook for Western Europe but still has a relatively low per capita consumption of forest products due to its low share of forest in the total land area. From 1960 to 1980 consumption is projected to rise 1.5% per annum but only 0.8% from 1980 to 2000. Despite this slowing of growth, however, the region's steady decline in self-sufficiency is expected to continue leading to a decrease from 34.6% in 1960 to 23.3% in 2000. Import requirements, which were about 6.8 million cbm in 1960, are expected to surpass 10 million cbm in 1980 and exceed 12 million cbm in the year 2000.

The changing composition of sawnwood consumption in this subregion is important. From 1960 to 1980 sawn softwood consumption is expected to increase at an annual rate of 1.3% whereas sawn hardwood's consumption is forecast to rise at a 2.6% rate. Sleepers are expected to decline 0.8% per annum. The relative share of these products, however, should not change much after 1980. Thus, the composition is projected to change as follows:

	from 1960	to 1980	to 2000
Sawn softwood	74.7%	70.8%	70.1%
Sawn hardwood	22.4%	27.4%	28.7%
Sleepers	2.9%	1.8%	1.2%

Nevertheless sawn softwood represents the biggest part of total sawnwood consumption. From 7.8 million cbm in 1960 total softwood consumption is projected to increase to 10.0 million cbm in 1980 and grow further to 11.5 million cbm in 2000. Self-sufficiency, however, is expected to fall from 20% in 1960 to 17% in 1980 and decline still further to 16% in 2000. Import requirements, which were 6.2 million cbm in 1960, are forecast to rise to 8.3 million cbm in 1980, 9.0 million cbm in 1990 and 9.7 million cbm in the year 2000.

The percentage rise projected for sawn hardwood consumption is more pronounced but the base is much smaller. From 1960 to 1980 it is estimated to increase by 1.4 million cbm or 2.2% per annum. In the 1980-2000 period, the increase is estimated to be only 0.8 million cbm for an annual growth rate of 0.9%. No increase in production of hardwood sawnwood is expected. As a result self-sufficiency is projected to decline from 77% in 1960 to 50% in 1980 and to 42% in 2000.

The consumption estimates above incorporate this sub-region's minimal consumption and production of sleepers. In 1960 consumption of sleepers was only 0.3 million cbm; it is projected at 0.2 million cbm by year 2000. Sleeper production is also expected to decrease, but less pronounced (from 1960 to 1980 by 12.8%), so that the self-sufficiency will remain more or less the same: 66% in 1960, 57% in 1980, and 68% in 2000.

4.1.5 NORDIC COUNTRIES

In the Nordic Countries sawnwood consumption seems to be near the saturation level. In the period 1960-80 the average annual increase is estimated at 1.5%, roughly equivalent to the Western European average. In the following period 1980-2000, however, it is expected to drop to an annual rate of 0.3%, even slower that the Western European average of 0.8%. Production, however, should continue to grow considerably, resulting in a 232% self-sufficiency level in the year 2000. The Nordic Countries should thus be able to reach a net-export level of about 14.3 million cbm in 2000.

Because of the nature of its forest, softwood sawnwood is by far more predominant in consumption than hardwood. It is, however, expected to increase its share of the total sawnwood consumption even further from 90.6% in 1960 to 94.0% in 2000. For the period 1960-80 consumption of sawn softwood is estimated to rise from 6.9 to 9.6 million cbm, an annual rate of 1.7%. In the following 20 years the increase should be much smaller, from 9.6 to 10.2 million cbm or a rate of 0.3%. The self-sufficiency is expected to grow from 238% in 1960 to 244% in 2000, the surplus being then 14.5 million cbm.

Sawn hardwood is rather unimportant in the Nordic Countries; its share in the total sawnwood consumption is expected to fall from 6.0% in 1960 to 5.5% in 2000. The annual increase in consumption, however, which should average 0.8% in the period 1960-80, should be about 0.6% in the period 1980-2000. Self-sufficiency should slightly increase from 80.8% in 1960 to 84.1% in 2000. A minor import level of 0.2 to 0.3 million cbm is projected throughout the forecast period.

Sleepers are losing in importance as everywhere. Apparent consumption of these predominantly softwood products is projected to decline from 0.3 million cbm in 1960 to less than 0.1 million cbm in 2000. Their share in the total sawnwood consumption will drop from 3.4% in 1960 to 0.5% in 2000. Self-sufficiency should decline from 108% in 1960 to 100% for the whole period 1980-2000.

4.1.6 OTHER WESTERN EUROPE

Except for Austria and Switzerland, the sub-region "Other Western Europe" is still shifting from an agricultural to an industrial economy. The share of the rural population is still high and the migration from the land to the industrial centers, towns and cities is still going on. Consequently, this sub-region's increase in sawnwood consumption is much bigger than in any other part of Western Europe.

Sawnwood consumption is expected to have risen between 1960 and 1980 from 8.6 to 18.3 million cbm, that is by 9.7 million cbm or an annual rate of 3.8% (Western European average: 1.6%). It should continue to rise at least through the end of this century reaching 22.7 million cbm by the year 2000. This represents a growth of 4.4 million cbm or 1.1% per year. (Western European average: 0.8%). Production is also projected to increase, but at a somewhat lower rate. This sub-region contains both net exporters (Austria, Portugal and Yugoslavia) and net importers (Spain, Switzerland and Greece). While the

While the former may maintain their export position, the import needs of the latter will be growing, so that overall the sub-region's self-sufficiency should decrease from 138% in 1960 to about 108% in 2000. The export surplus of Other Western Europe is expected to decline from 3.3 million cbm in 1960 to 1.9 million cbm in 2000.

Sawn softwood has been three quarters of the total sawnwood consumption in the past and is expected to remain so in the future. In 1960 it was 6.4 million cbm (excluding sleepers). It rose to 13.7 million cbm in 1980 (3.9% annually or more than double the Western European average) and should further increase to 16.9 million cbm in 2000 (1.1% per annum, still faster than the Western European average of 0.7%). Self-sufficiency, which was almost 150% in 1960, is projected to decline to 111% in 2000, leaving a surplus of 1.9 million cbm for net exports.

The share of sawn hardwood (excluding sleepers) is expected to increase from 19.9% in 1960 to 24.2% in 2000. Consumption should grow threefold, from 1.7 million cbm in 1960 to 5.5 million cbm in the year 2000; two-thirds of this increase is expected to have occurred by 1980.

Sleepers are again only a minor fraction of the sub-region's consumption and production. Their consumption is projected to decline from 0.5 million cbm in 1960 to 0.3 million cbm in 2000. Self-sufficiency has risen in recent years to as much as 122% in 1970. A small level of exports is projected throughout the forecast period as domestic consumption drops more rapidly than production.

4.2 PANELS

Total panel consumption in Western Europe grew rapidly during the 1960's, mainly due to increasing usage of reconstituted panels. During the 1970's, panel consumption has continued to grow, but at a much less rapid pace. The compound annual growth rate from 1970 to 1980 is expected to be 4.7% per year, compared with 10.0% per year in the preceding decade. Panel consumption should continue to grow, but at a rate of only about 2.5% per year between 1980 and 2000. Reconstituted panels should continue to account for most of the growth, increasing their share of total panel consumption:

	Share of Total Panel Consumption				
	1960	1970	1980	1990	2000
Solidwood Panels	31%	20%	16%	15%	14%
Reconstituted Panels	69	80	84	85	86

Western European panel production grew slightly more rapidly than consumption during the 1960's, making the region 99% self-sufficient by 1970. Reconstituted panel exports, mainly to Eastern Europe, largely offset solidwood panel imports. Since 1970, the region's self-sufficiency has deteriorated; this deterioration is expected to continue throughout the period as plywood imports increase and particleboard exports decrease.

Despite the reduced availability of softwood logs, the softwood share of total panel consumption and production is expected to increase slightly, reflecting increased softwood plywood imports and increased use of residuals in the manufacture of reconstituted panels.

Solidwood panels - Consumption growth has slowed from an annual rate of 5.7% during the 1960's to 2.4% during the 1970's. Production of solidwood panels has dropped even more, resulting in a decline in self-sufficiency from 87% in 1960 to 85% in 1970 and to a projected 64% in 1980. A sharp decline in blockboard production, a reduced supply of domestic peeler logs, and the increasing substitution of other materials (notably reconstituted panels) for solidwood panels, have all contributed to the slowdown in production and consumption. Consumption growth is expected to decelerate to 1.9% per year from 1980 to 1990 and 1.2% per year from 1990-2000. Domestic production will be further curtailed as the domestic supply of peeler logs dwindles and log imports are replaced by product imports from the less developed regions. This should result in a further drop in self-sufficiency to approximately 56% in 1990 and 47% by the year 2000.

As domestic production declines in importance, the softwood share of consumption is expected to grow, reflecting increased imports of softwood plywood from the U.S.S.R. and North America. Hardwood plywood production may be constrained by the reduced availability of hardwood logs from Africa. The softwood share of solidwood panel consumption is projected to increase from 17% in 1960 and 19% in 1970 to 23% in 1980 and 27% in 2000.

Reconstituted panels - Western Europe's dramatic growth in reconstituted panel consumption and production, which averaged close to 12% per year during the 1960's, has slowed somewhat during the 1970's. The estimated annual consumption growth of 5.3% from 1970 to 1980 still exceeds the growth rate for most other building materials, indicating that new uses continue to be found for reconstituted panels. As new uses and opportunities for substitution arise less frequently, the annual rate of increase in consumption is likely to decline further to an estimated 2.9% per year from 1980-1990 and 2.5% per year from 1990 to 2000.

Very little trade in this product is expected except for some exports to Eastern Europe, so that self-sufficiency is projected barely to exceed 100% throughout the period. No significant change is expected in the softwood/hardwood mix for Western Europe as a whole, although there may be shifts in individual areas. The use of flax in France and Other EEC countries is expected to decline gradually.

4.2.1 FRANCE

Solidwood panels - Consumption of solidwood panels in France grew at over 10% per year from 1960-70, then slowed to almost a standstill during the 1970's. Consumption growth should pick up during the 1980's along with the overall pace of economic activity, then drop off again during the 1990's as construction decreases and other materials are substituted. Production is not expected to show any growth at all beyond the 1970 levels of output, reducing self-sufficiency from virtually 100% in 1970 to only 62% in 2000. Production should be constrained by the lack of domestic log supply of suitable quality and by the declining availability of hardwood peeler logs from Africa.

Reconstituted panels - French domestic consumption of reconstituted panels has continued to increase in recent years but at a slower rate than the 15%-plus annual growth recorded during the 1960's. Consumption growth is projected to exceed 4% per year during the 1970's, slowing to 2.8% per year during the 1980's and 2.2% per year during the 1990's. French production of reconstituted panels is expected to grow more rapidly than consumption, making France a net exporter to the rest of Western Europe. Hardwood should become increasingly important, constituting nearly 70% of the fiber input by the year 2000.

4.2.2 FEDERAL REPUBLIC OF GERMANY

Solidwood panels - West Germany's consumption of solidwood panels has been growing at a very slow pace since 1960. The growth rate should continue to average around 2.3% until 1990; total consumption is expected to remain level between 1990 and 2000. No increase in production is expected beyond the 1980 output, so that the level of self-sufficiency will deteriorate during the 1980's. This should make West Germany a net importer of both hardwood and softwood solidwood panels from 1980 onward.

Reconstituted panels - During the 1960's and 70's, West Germany was Western Europe's leading producer and consumer of reconstituted panels. In 1970, it accounted for almost 30% of the region's production and 32% of its consumption. In Germany as in France the growth in reconstituted panel consumption has slowed considerably during the 1970's and should decelerate further during the next two decades. However, the lack of fiber resources is expected to cause domestic supply to lag behind even this slower-growing demand. As a result, Germany's share of Western European production and its self-sufficiency should begin to decline, making Germany a net importer of reconstituted panels beyond 1980.

4.2.3 UNITED KINGDOM

Solidwood panels - Consumption of solidwood panels in the United Kingdom grew rapidly during the 1960's but has shown no further increase since 1970. Consumption is expected to grow at the modest pace of 1% to 2% per year throughout the rest of the period. The United Kingdom produces virtually no solidwood panels and will continue to depend on imports to satisfy its needs. These imports should consist of about 25% to 30% softwood between 1980 and 2000.

Reconstituted panels - Demand for reconstituted panels did not grow as rapidly in the United Kingdom during the 1960's as it did in West Germany and France. The current decade has witnessed more rapid growth, as reconstituted panels have begun to replace solidwood panels in many uses. Consumption growth is expected to slow from 5.7% per year between 1970 and 1980 to 2.9% per year from 1980 to 1990 and 2.6% per year from 1990 to 2000. Production has been increasing slightly more rapidly than consumption but is not expected to continue to do so, resulting in a levelling off in self-sufficiency at about 32%. Softwood should make up a growing share of domestic production, the United Kingdom being one of the few countries in Western Europe where a strong growth in the supply of softwood fiber logs is expected over the two coming decades. Even so, the United Kingdom should continue to be a net importer of reconstituted panels.

4.2.4 OTHER EEC COUNTRIES

Solidwood panels - Consumption of solidwood panels in the Other EEC Countries has increased at an estimated annual rate of 6.6% during the 1970's, but very little additional growth is expected during the remainder of the century. With a sharp decline in domestic log availability, production is actually forecasted to be lower in 2000 than it was in 1970. Self-sufficiency is therefore expected to drop from 89% in 1970 to only 25% in 2000. Even with little or no growth in domestic demand, the Other EEC Countries are expected to remain net importers of both softwood and hardwood solidwood panels.

Reconstituted panels - Consumption of reconstituted panels, which has been growing at about 5.6% per year during the 1970's, is expected to increase at an annual rate of 2.5% to 3% from 1980 to 2000. Due to a lack of raw materials, production is expected to grow more slowly than consumption, leading to a drop in self-sufficiency beyond 1980. Softwood is expected to account for a growing share of reconstituted panel production as residual usage increases.

4.2.5 NORDIC COUNTRIES

Solidwood panels - Consumption of solidwood panels in the Nordic countries increased at an annual rate of 4.1% during the 1960's. This growth rate is expected to accelerate to 5.2% during the 1970's and 4.8% during the 1980's. Little or no growth is forecast for the 1990-2000 period. The Nordic area is one of the few parts of Western Europe where solidwood panel consumption continues to experience rapid growth because it is one of the few areas with an adequate log supply to meet its needs domestically. Although the Nordic countries should not require imports, they are unlikely to have a significant surplus of solidwood panels for export to other Western European countries beyond 1980.

Reconstituted panels - Reconstituted panel usage has not been growing as rapidly in the Nordic countries as in other areas of Western Europe, probably because the domestic supply of solidwood panels has reduced the impetus for substitution. Consumption of reconstituted panels is forecast to grow at just under 2% per year from 1980 to 2000. The Nordic countries should continue to be a major exporter of reconstituted panels to the rest of Western Europe, as production growth grows at a pace which keeps self-sufficiency at about 200%. Although softwood is expected to continue as the primary component, hardwood's share should rise somewhat with the increased use of residuals.

4.2.6 OTHER WESTERN EUROPE

Solidwood panels - After a solid growth of 9.6% per year during the 1960's, solidwood panel consumption in the Other Western European countries has been increasing at only about 1% per year during the 1970's. The growth rate is expected to accelerate to 3.2% per year during the next decade as overall economic growth picks up in these countries, then drop to 1.8% per year from 1990 to 2000. Solidwood panel production should also be increasing in this area, but should lag slightly behind consumption, making the Other Western European countries slight net importers by the year 2000. Almost all of the local production should remain in hardwood, with the softwood share constituting less than 10%.

Reconstituted panels - Growth in reconstituted panel consumption has been rapid in this area, at 16.7% per year during the 1960's and about 7% per year during the 1970's. The growth rate is expected to slow down after 1980 but still remain the highest in Western Europe at 3.8% per year between 1980 and 1990 and 3.1% per year from 1990 to 2000. The Other Western European countries are expected to become the region's largest producer of reconstituted panels by the year 2000 and to be a major exporter to the other Western European countries throughout the 1980's and 1990's.

4.3 OTHER INDUSTRIAL PRODUCTS

The other industrial products group is primarily composed of poles, pilings and pitprops. The markets for these products tend to be stagnant or declining. The Working Party's forecast for this product group has been developed by analyzing usage trends relative to economic activity coupled with its awareness of the region's projected tight supply position for industrial roundwood.

Consumption of other industrial wood products in Western Europe is projected to decline from 21.7 million cbm in 1960 to 14.0 and 12.2 million cbm in 1980 and 2000 respectively. Both softwood and hardwood products are expected to be affected. Softwood products are projected to decline from 13.5 to 6.8 million cubic meters between 1960 and 2000. Hardwood products are expected to drop from 8.2 to 5.4 million cbm during the same period.

Europe is fundamentally self-sufficient for these products. The United Kingdom is, however, a significant importer of pitprops, and a level of several hundred thousand cbm is projected through the balance of the century. The outlook for consumption, production and trade in other industrial products is presented on Table 4.0.

4.4 WOOD PULPS

Western Europe's consumption of fiber in wood pulps during the 1980-2000 period is expected to grow only 2.1% per year, roughly half the 4.0% rate estimated for the 1960-80 period. Nonetheless, the total fiber consumed in the 1980-2000 period should grow in absolute terms by about the same order of magnitude as it did in the previous two decades. It is projected to increase from 60.6 million cbm in 1960 to 133.5 and 200.8 million cbm in 1980 and 2000 respectively. Table 4.0.0.1 in Appendix II and the supporting tables which follow it show the fiber volumes estimated for each pulp category.

The outlook from which this forecast is fundamentally derived has been presented in Phases II and III of the study. Consequently, there is only limited discussion in this report of the expected changes in each subregion. For further details, the reader is referred to the reports for each subregion contained in Phases II and III.

Table 4.0.0.2 shows the projected consumption and production estimates which the Working Party has used to develop the fiber numbers for each pulp category in Western Europe. It is followed by supporting tables for each sub-region. The reader will note that little interregional trade is projected in the mechanical/semichemical and unbleached kraft categories. Production forecasts for these grades were not included in Phase II, but the Working Party is satisfied to base its forecasts on the Phase II consumption estimates using historical trade relationships as a guide to production. The dissolving pulp forecast has been developed independently by the Project Leader using his limited knowledge of industry trends because of disappointing support from domestic producers. Although this outlook could be erroneous, the magnitude of any error should be minimal because dissolving pulp represents only 31% of the region's production.

The fiber yields used in the report have been based on the recommendations of the pulp and paper Working Party. Production yields which have been estimated for 1980 average per ton about 2.6 cbm for mechanical/semichemical pulp, 4.9 cbm for unbleached kraft pulp, 4.7 cbm for white chemical pulp and 5.5 cbm for dissolving pulp. The unbleached kraft yield is deceptively higher than those for white pulp because softwoods are used almost exclusively in unbleached kraft. The comparable yield for bleached softwood chemical pulp is estimated to be about 5.2 cbm/ton.

Yields are expected to improve for most products and regions during the forecast period. Overall pulp production between 1980 and 2000 is expected to increase at an annual rate of 2.0% (from 30.6 to 45.6 million tons). The fiber required to produce pulp, however, is projected to grow at a 1.8% rate from 121.4 to 173.5 cbm. Softwood fibers are expected to continue their position as the dominant pulp component. Compared with 81% of the furnish consumed in 1960, they are expected to be 76% in 1980 and 73% in 2000.

Self-sufficiency for pulp fibers is expected to continue the decline which began in the early 1960's. By 1980 self-sufficiency is expected to be 93%, falling to 89% by 2000. Softwood self-sufficiency (91%) is expected to exceed that of hardwood (85%) as the imports of chemical pulp from tropical hardwoods becomes a significant factor.

TABLE 4.0
WESTERN EUROPE

OUTLOOK FOR WOOD PRODUCTS

(Millions of Cubic Meters)

	1960		1970		1980		1990		2000	
	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.
Softwood										
Sawnwood & Sleepers	43.8	39.5	57.2	50.1	59.9	55.0	65.1	58.8	69.0	61.2
Solidwood Panels	0.5	0.3	1.0	0.7	1.5	0.6	1.8	0.7	2.4	0.7
Reconstituted Panels	4.5	4.7	12.3	12.9	20.3	21.0	26.8	27.2	34.9	36.3
Other Ind. Products	13.5	13.8	9.6	8.7	7.9	7.7	7.0	6.8	6.8	6.5
Pulps	48.6	49.4	85.8	79.9	99.4	92.4	118.0	108.1	143.2	126.9
TOTAL SOFTWOOD	110.9	107.7	165.9	152.3	189.0	176.7	218.7	201.6	256.3	231.6
Hardwood										
Sawnwood & Sleepers	12.1	10.5	15.5	13.4	16.9	13.8	19.0	14.9	20.8	16.4
Solidwood Panels	2.5	2.3	4.2	3.7	5.1	3.6	6.2	3.8	6.6	3.5
Reconstituted Panels	2.3	2.1	7.9	7.8	13.4	14.3	18.1	18.9	22.4	22.1
Other Ind. Products	8.2	8.4	7.2	7.7	6.1	6.1	5.5	5.5	5.4	5.5
Pulps	12.0	11.4	25.7	22.7	34.1	29.0	45.5	35.9	57.6	46.6
TOTAL HARDWOOD	37.1	34.7	60.5	55.3	75.6	66.8	94.3	79.0	112.8	94.1
Total Softwood & Hardwood										
Sawnwood & Sleepers	55.9	50.0	72.7	63.5	76.8	68.8	84.1	73.7	89.8	77.6
Solidwood Panels	3.0	2.6	5.2	4.4	6.6	4.2	8.0	4.5	9.0	4.2
Reconstituted Panels	6.8	6.8	20.2	20.7	33.7	35.3	44.9	46.1	57.3	58.4
Other Ind. Products	21.7	22.2	16.8	16.4	14.0	13.8	12.5	12.3	12.2	12.0
Pulps	60.6	60.8	111.5	102.6	133.5	121.4	163.5	144.0	200.8	173.5
TOTAL	148.0	142.4	226.4	207.6	264.6	243.5	313.0	280.6	369.1	325.7

TABLE 4.0.1

FRANCE

OUTLOOK FOR WOOD PRODUCTS

(Millions of Cubic Meters)

	1960		1970		1980		1990		2000	
	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.
Softwood										
Sawnwood & Sleepers	5.1	5.0	7.2	5.7	7.4	5.6	8.1	5.6	8.9	5.7
Solidwood Panels	-	-	0.1	0.1	0.2	0.1	0.3	0.1	0.4	0.2
Reconstituted Panels	0.3	0.3	1.3	1.3	2.1	1.7	2.8	2.5	3.6	3.1
Other Ind. Products	1.0	1.3	0.8	0.8	0.6	0.6	0.8	0.7	0.9	0.8
Pulps	5.9	2.7	8.6	4.4	10.6	5.8	12.2	7.5	14.2	9.6
TOTAL SOFTWOOD	12.3	9.3	18.0	12.3	20.9	13.8	24.2	16.4	28.0	19.4
Hardwood										
Sawnwood & Sleepers	2.7	3.2	3.8	4.0	4.1	4.3	4.6	4.9	5.1	5.4
Solidwood Panels	0.3	0.4	0.7	0.7	0.7	0.7	0.9	0.7	0.9	0.6
Reconstituted Panels	0.3	0.4	1.2	1.2	1.7	2.7	2.2	4.8	2.6	7.0
Other Ind. Products	0.8	0.9	0.8	0.8	0.7	0.7	0.8	0.8	1.0	1.1
Pulps	2.3	1.2	3.1	2.6	5.0	3.5	6.1	4.1	7.4	4.8
TOTAL HARDWOOD	6.4	6.1	9.6	9.3	12.2	11.9	14.6	15.3	17.0	18.9
Total Softwood & Hardwood										
Sawnwood & Sleepers	7.8	8.2	11.0	9.7	11.5	9.9	12.7	10.5	14.0	11.1
Solidwood Panels	0.3	0.4	0.8	0.8	0.9	0.8	1.2	0.8	1.3	0.8
Reconstituted Panels	0.6	0.7	2.5	2.5	3.8	4.4	5.0	7.3	6.2	10.1
Other Ind. Products	1.8	2.2	1.6	1.6	1.3	1.3	1.6	1.5	1.9	1.9
Pulps	8.2	3.9	11.6	7.0	15.6	9.3	18.3	11.6	21.6	14.4
TOTAL	18.7	15.4	27.5	21.6	33.1	25.7	38.8	31.7	45.0	38.3

TABLE 4.0.2

WEST GERMANY

OUTLOOK FOR WOOD PRODUCTS

(Millions of Cubic Meters)

	1960		1970		1980		1990		2000	
	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.
Softwood										
Sawnwood & Sleepers	9.3	6.3	11.1	7.9	11.4	8.5	12.4	8.9	13.1	9.1
Solidwood Panels	0.2	0.2	0.3	0.2	0.4	0.2	0.4	0.2	0.5	0.2
Reconstituted Panels	1.1	0.9	3.9	3.6	6.1	6.0	8.1	7.7	10.3	9.3
Other Ind. Products	3.2	2.6	1.8	1.9	1.4	1.4	1.3	1.3	1.1	1.0
Pulps	7.7	4.2	10.9	4.8	13.4	6.3	17.1	8.2	20.3	9.2
TOTAL SOFTWOOD	21.5	14.2	28.0	18.4	32.7	22.4	39.3	26.3	45.3	28.8
Hardwood										
Sawnwood & Sleepers	1.9	1.7	2.5	2.2	2.6	2.2	3.0	2.3	3.2	2.5
Solidwood Panels	0.7	0.7	0.7	0.8	0.8	0.6	1.1	0.6	1.0	0.6
Reconstituted Panels	0.7	0.6	2.6	2.5	4.1	3.8	5.5	4.0	6.8	4.4
Other Ind. Products	2.5	2.4	1.2	1.1	1.2	1.2	1.0	1.0	0.9	0.9
Pulps	2.3	1.1	3.6	1.3	4.9	1.3	6.2	1.8	8.3	2.2
TOTAL HARDWOOD	8.1	6.5	10.6	7.9	13.6	9.1	16.8	9.7	20.2	10.6
Total Softwood & Hardwood										
Sawnwood & Sleepers	11.2	8.0	13.6	10.1	14.0	10.7	15.4	11.2	16.3	11.6
Solidwood Panels	0.9	0.9	1.0	1.0	1.2	0.8	1.5	0.8	1.5	0.8
Reconstituted Panels	1.8	1.5	6.5	6.1	10.2	9.8	13.6	11.7	17.1	13.7
Other Ind. Products	5.7	5.0	3.0	3.0	2.6	2.6	2.3	2.3	2.0	1.9
Pulps	10.0	5.3	14.4	6.1	18.3	7.6	23.3	10.0	28.6	11.4
TOTAL	29.6	20.7	38.5	26.3	46.3	31.5	56.1	36.0	65.5	39.4

TABLE 4.0.3

UNITED KINGDOM

OUTLOOK FOR WOOD PRODUCTS

(Millions of Cubic Meters)

	1960		1970		1980		1990		2000	
	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.
Softwood										
Sawnwood & Sleepers	8.0	0.4	8.5	0.5	7.6	0.8	8.0	0.9	8.2	1.1
Solidwood Panels	0.1	-	0.3	-	0.3	-	0.4	-	0.5	-
Reconstituted Panels	1.2	0.2	1.4	0.3	2.3	0.8	2.9	1.2	3.8	1.6
Other Ind. Products	1.2	0.4	0.5	0.2	0.4	0.2	0.4	0.2	0.6	0.3
Pulps	7.3	0.8	8.5	0.9	8.2	0.7	8.9	0.7	9.5	2.9
TOTAL SOFTWOOD	17.8	1.8	19.2	1.9	18.8	2.5	20.6	3.0	22.6	5.9
Hardwood										
Sawnwood & Sleepers	2.3	0.8	1.4	0.7	1.2	0.4	1.3	0.3	1.4	0.3
Solidwood Panels	0.5	-	0.9	-	0.9	-	0.9	-	1.1	-
Reconstituted Panels	0.2	-	0.5	0.2	1.0	0.3	1.5	0.2	1.9	0.2
Other Ind. Products	-	-	-	-	-	-	-	-	-	-
Pulps	2.4	0.1	4.5	0.3	5.0	0.4	5.8	0.4	6.0	0.4
TOTAL HARDWOOD	5.4	0.9	7.3	1.2	8.1	1.1	9.5	0.9	10.4	0.9
Total Softwood & Hardwood										
Sawnwood & Sleepers	10.3	1.2	9.9	1.2	8.8	1.2	9.3	1.2	9.6	1.4
Solidwood Panels	0.6	-	1.2	-	1.2	-	1.3	-	1.6	-
Reconstituted Panels	1.4	0.2	1.9	0.5	3.3	1.1	4.4	1.4	5.7	1.8
Other Ind. Products	1.2	0.4	0.5	0.2	0.4	0.2	0.4	0.2	0.6	0.3
Pulps	9.7	0.9	13.0	1.2	13.2	1.1	14.7	1.1	15.5	3.3
TOTAL	23.2	2.7	26.5	3.1	26.9	3.6	30.1	3.9	33.0	6.8

TABLE 4.0.4

OTHER EEC

OUTLOOK FOR WOOD PRODUCTS

(Millions of Cubic Meters)

	1960		1970		1980		1990		2000	
	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.
Softwood										
Sawnwood & Sleepers	7.8	1.6	9.8	1.6	10.0	1.7	10.7	1.7	11.5	1.8
Solidwood Panels	0.1	-	0.1	0.1	0.3	-	0.2	0.1	0.4	-
Reconstituted Panels	0.4	0.3	2.0	2.2	3.7	3.9	5.0	4.3	6.6	4.7
Other Ind. Products	1.4	1.3	1.9	1.5	1.1	1.1	0.6	0.6	0.5	0.5
Pulps	6.7	2.0	11.9	3.2	13.2	3.7	16.3	4.6	20.8	5.3
TOTAL SOFTWOOD	16.4	5.2	25.7	8.6	28.3	10.4	32.8	11.3	39.8	12.3
Hardwood										
Sawnwood & Sleepers	2.6	2.0	4.2	2.7	4.0	2.0	4.4	1.8	4.8	2.0
Solidwood Panels	0.5	0.5	0.8	0.7	1.4	0.7	1.5	0.7	1.6	0.5
Reconstituted Panels	0.7	0.4	2.0	1.8	3.2	3.0	4.1	2.9	5.0	3.0
Other Ind. Products	0.9	0.8	1.7	1.9	0.9	0.9	0.5	0.5	0.4	0.4
Pulps	2.1	0.8	4.4	1.7	5.1	2.4	8.2	3.1	11.3	4.1
TOTAL HARDWOOD	6.8	4.5	13.1	8.8	14.6	9.0	18.7	9.0	23.1	10.0
Total Softwood & Hardwood										
Sawnwood & Sleepers	10.4	3.6	14.0	4.3	14.0	3.7	15.1	3.5	16.3	3.8
Solidwood Panels	0.6	0.5	0.9	0.8	1.7	0.7	1.7	0.8	2.0	0.5
Reconstituted Panels	1.1	0.7	4.0	4.0	6.9	6.9	9.1	7.2	11.6	7.7
Other Ind. Products	2.3	2.1	3.6	3.4	2.0	2.0	1.1	1.1	0.9	0.9
Pulps	8.8	2.8	16.3	4.9	18.3	6.1	24.5	7.7	32.1	9.4
TOTAL	23.2	9.7	38.8	17.4	42.9	19.4	51.5	20.3	62.9	22.3

TABLE 4.0.5

NORDIC COUNTRIES

OUTLOOK FOR WOOD PRODUCTS

(Millions of Cubic Meters)

	1960		1970		1980		1990		2000	
	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.
Softwood										
Sawnwood & Sleepers	7.1	16.7	9.6	21.1	9.7	22.4	10.0	23.9	10.2	24.8
Solidwood Panels	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.2	0.3	0.3
Reconstituted Panels	1.1	2.6	2.0	3.7	2.8	4.6	3.3	5.4	4.0	7.6
Other Ind. Products	2.9	4.2	1.1	1.5	0.9	0.9	0.6	0.7	0.6	0.8
Pulps	17.0	35.9	36.5	58.8	41.0	64.8	46.1	71.4	54.0	78.8
TOTAL SOFTWOOD	28.2	59.5	49.3	85.3	54.6	92.9	60.3	101.6	69.1	112.3
Hardwood										
Sawnwood & Sleepers	0.5	0.4	0.5	0.4	0.5	0.3	0.5	0.3	0.6	0.3
Solidwood Panels	0.1	0.3	0.2	0.6	0.3	0.5	0.5	0.5	0.5	0.4
Reconstituted Panels	0.2	0.4	0.5	0.9	1.2	1.7	1.5	2.9	1.8	3.7
Other Ind. Products	0.7	0.8	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2
Pulps	1.7	7.1	5.6	12.2	6.8	13.4	9.4	14.8	12.7	17.1
TOTAL HARDWOOD	3.2	9.0	7.1	14.4	9.0	16.1	12.1	18.7	15.8	21.7
Total Softwood & Hardwood										
Sawnwood & Sleepers	7.6	17.1	10.1	21.5	10.2	22.7	10.5	24.2	10.8	25.1
Solidwood Panels	0.2	0.4	0.3	0.8	0.5	0.7	0.8	0.7	0.8	0.7
Reconstituted Panels	1.3	3.0	2.5	4.6	4.0	6.3	4.8	8.3	5.8	11.3
Other Ind. Products	3.6	5.0	1.4	1.8	1.1	1.1	0.8	0.9	0.8	1.0
Pulps	18.7	43.0	42.2	71.0	47.8	78.2	55.5	86.2	66.7	95.9
TOTAL	31.4	68.5	56.5	99.7	63.6	109.0	72.4	120.3	84.9	134.0

TABLE 4.0.6

OTHER WESTERN EUROPE

OUTLOOK FOR WOOD PRODUCTS

(Millions of Cubic Meters)

	1960		1970		1980		1990		2000	
Softwood	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.
Sawnwood & Sleepers	6.5	9.5	11.0	13.3	13.8	16.0	15.9	17.8	17.0	18.7
Solidwood Panels	-	-	0.1	0.1	0.1	0.1	0.2	0.1	0.3	0.1
Reconstituted Panels	0.4	0.4	1.7	1.8	3.3	4.0	4.7	6.1	6.6	10.0
Other Ind. Products	3.8	4.0	3.5	2.8	3.5	3.5	3.3	3.3	3.1	3.1
Pulps	4.0	3.8	9.5	7.8	13.0	11.1	17.4	15.7	24.4	21.1
TOTAL SOFTWOOD	14.7	17.7	25.8	25.8	33.7	34.7	41.5	43.0	51.4	53.0
Hardwood										
Sawnwood & Sleepers	2.1	2.4	3.1	3.4	4.5	4.6	5.2	5.3	5.7	5.9
Solidwood Panels	0.4	0.4	0.9	0.9	1.0	1.1	1.3	1.3	1.5	1.4
Reconstituted Panels	0.2	0.3	1.1	1.2	2.2	2.8	3.3	4.1	4.3	3.8
Other Ind. Products	3.3	3.5	3.2	3.6	3.1	3.1	3.0	3.0	2.9	2.9
Pulps	1.2	1.1	4.6	4.6	7.4	8.0	9.9	11.7	11.9	18.0
TOTAL HARDWOOD	7.2	7.7	12.9	13.7	18.2	19.6	22.7	25.4	26.3	32.0
Total Softwood & Hardwood										
Sawnwood & Sleepers	8.6	11.9	14.1	16.7	18.3	20.6	21.1	23.1	22.7	24.6
Solidwood Panels	0.4	0.4	1.0	1.0	1.1	1.2	1.5	1.4	1.8	1.5
Reconstituted Panels	0.6	0.7	2.8	3.0	5.5	6.8	8.0	10.2	10.9	13.8
Other Ind. Products	7.1	7.5	6.7	6.4	6.6	6.6	6.3	6.3	6.0	6.0
Pulps	5.2	4.9	14.1	12.4	20.4	19.1	27.3	27.4	36.3	39.1
TOTAL	21.9	25.4	38.7	39.5	51.9	54.3	64.2	68.4	77.7	85.0

JAPAN

5.0 JAPAN

Japan's consumption of fiber products has more than doubled in the last two decades. Compared with an estimated 46.8 million cbm in 1960, consumption is estimated at 102.0 million cbm in 1980. By 2000 the Working Party estimates consumption to reach 168.8 million cbm. This is equivalent to a 2.6% annualized growth rate, down from an estimated 4.0% for the 1960-80 period.

Japan's growing fiber deficit is well-known. Its self-sufficiency for fiber products in 1960 was close to unity but had already fallen to 91% in 1970. The Working Party estimates a continuation of this decline, reaching 81% by the year 2000. As subsequent sections of this report and Phase V will show, however, this 81% self-sufficiency level may prove to be optimistic. There are significant economic and political forces at work which could reduce the raw fiber supply to Japanese industry, thereby increasing Japan's requirements to import more finished and semi-finished fiber products than the study projects.

5.1 SAWNWOOD AND SLEEPERS

Japanese consumption of sawnwood should continue to grow during the next two decades, although at a reduced rate. Softwood's share should increase from about 83% in 1980 to 90% in 2000. Consumption of all sawnwood products in Japan is projected to grow from an estimated 1980 trend level of 44.6 million cbm to 53.8 million cbm in the year 2000. This annual growth rate of 0.9% is considerably lower than that experienced during the 1960-80 period (2.6%). It is significant that softwood sawnwood consumption is projected to grow from 37.1 million cbm in 1980 to 48.5 million cbm in 2000 or at an annual rate of 1.3%, whereas hardwood sawnwood should drop from 7.5 million cbm in 1980 to 5.3 million cbm in 2000. This reflects the Working Party's view that imported tropical hardwood roundwood will become increasingly difficult to obtain, whereas production from domestic softwood forests will increase markedly and softwood roundwood imports will grow somewhat. Sleeper consumption, already negligible in 1980, is projected to decline still further.

The forecast methodology for sawnwood has consisted of constructing a number of econometric models using the various factors which could affect future consumption. It has been found that the demographic variable of the growth of the population of males between 25 and 59 is the most relevant. Consequently, this factor has been used as the basic factor in forecasting consumption of sawnwood, plywood, particleboard, and fiberboard.

Japan should remain a net importer of sawnwood. The projected trend for sawnwood trade is for softwood imports to rise from 2.8 million cbm in 1980 to 4.1 million cbm in 2000, and for hardwood imports to grow from 0.4 million cbm to 1.0 million during the same period. The Working Party feels that sawnwood imports into Japan will be limited by the availability of the species and specifications required by the Japanese market. Any shift away from traditional materials and construction methods is expected to occur very slowly. This is expected to be the main factor affecting the country's self-sufficiency rate which for softwood sawnwood should remain stable at 92%. Hardwood sawnwood's self-sufficiency, however, should decline from 95% in 1980 to about 81% in 2000.

5.2 PANEL PRODUCTS

Plywood is expected to remain the most important panel product consumed in Japan, but its share is projected to decline. An overall scarcity of panel products is foreseen.

Hardwood plywood consumption, which accounts for almost all plywood consumed in Japan today (7 million cbm in 1975), is expected to peak in 1980 (7.3 million cbm) and then decline to 6.5 million cbm in 2000. This decline in consumption is expected to arise because of the significant reduction in availability of hardwood veneer log exports from the ASEAN area. This declining log availability will only in part be offset by hardwood plywood imports from the Far East. Although these imports into Japan from ASEAN producers are projected to grow from 0.5 million cbm in 1980 to 2.9 million cbm in 2000, there should still be a shortage of panels.

This latent demand for panel products is expected to be satisfied by two other main categories. The first of these is softwood plywood. A domestic softwood plywood industry is forecast to emerge, growing from nothing in 1980 to 1.2 million cbm in the year 2000. The Working Party perceives that a global tightness in the demand/supply balance of this product by 1990 will deter the evolution of such major imports.

Japan's most rapid growth in panel consumption is expected to be in particleboard. These panels, particularly softwood particleboard, are forecast to grow from an estimated 1.0 million cbm in 1980 to 5.0 million cbm in the year 2000. While the demand for particleboard expressed here is no doubt realistic, there is some question about the availability of sufficient raw material to produce the requisite panels. Japan is already a major importer of softwood pulpwoods, and it may find new supply increments to be too costly to justify their import for domestic production of reconstituted panels.

The methodology used in preparing these consumption projections for panel products was originally the same as used above for lumber consumption. The hardwood consumption levels in the original estimates were 8 million cbm in 1980 and 10.4 million cbm in 2000, and total panel consumption was estimated at 10.8 million cbm in 1980 and 17.0 million cbm in 2000. The June 1978 Working Party meeting in Rome, however, identified a potential constraint on world plywood supply. This necessitated a reassessment of Japan's consumption patterns, and it is these new revised figures which are used in this study. Presumably any increased availability of competitive plywood from other regions to the Japanese market could cause an increase in consumption.

Japan's self-sufficiency in plywood is projected to decline from an estimated 93% in 1980 to 60% in the year 2000.

5.3 OTHER INDUSTRIAL PRODUCTS

The consumption of other industrial products in Japan has been declining steadily despite the region's rapid economic growth. Compared with 5.3 million cbm in 1960, consumption had already fallen to 2.5 million cbm in 1970. A key factor underlying this change is the decline in consumption of pitprops, down from 2.4 to 0.7 million cbm in that period. Consumption of wooden pitprops is projected to decline still further to 0.2 million cbm in 1980 where it is expected to stabilize. The balance of the products in this category should maintain their consumption in the 0.9 to 1.1 million cbm range.

5.4 WOOD PULP PRODUCTS

Japan's domestic consumption of wood pulp fibers is projected to more than double in the 1980-2000 period. Its growth, however, will be much slower than in the previous two decades. Compared with a domestic growth of 6.2% in the 1960-80 period, consumption is expected to rise from 43.8 to 94.0 million cbm between 1980 and 2000 for a growth rate of 3.9%. Softwoods are expected to account for a slightly larger share of consumption, rising from 51% in 1980 to 55% in 2000.

Japan has been a net importer of pulp for two decades. In terms of fiber consumed, its self-sufficiency has fallen from 92% in 1960 to an estimated 88% in 1980. A further decline to 82% in 1990 and 75% by 2000 is projected. Underlying this decline is the well-known shortage of domestic pulpwood and an impending decline in by-product chips. Although the Working Party estimates that it will be feasible for Japan to reach the 70.4 million cbm level projected for 2000; that level may be too optimistic. Should a lower production level be needed because of softwood chip supply problems and costs, it seems probable that Japan would begin importing substantial quantities of commodity papers such as newsprint or linerboard. In any event, Japan's shortage of economical fibers for pulping is projected to become increasingly severe during the next two decades.

TABLE 5.0

JAPAN

OUTLOOK FOR WOOD PRODUCTS

(Millions of Cubic Meters)

	1960		1970		1980		1990		2000	
	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.
Softwood										
Sawnwood & Sleepers	21.6	21.4	34.8	32.5	37.1	34.3	45.6	42.1	48.5	44.4
Solidwood Panels	-	-	-	-	-	-	0.7	0.7	1.5	1.2
Reconstituted Panels	0.2	0.2	0.7	0.6	2.4	2.4	5.7	5.7	8.9	8.9
Other Ind. Products	3.4	3.3	1.6	1.4	1.1	1.1	1.0	1.0	1.0	1.0
Pulps	8.5	7.7	15.7	12.0	22.3	19.5	34.2	28.1	52.1	40.8
TOTAL SOFTWOOD	33.7	32.6	52.8	46.5	62.9	57.3	87.2	77.6	112.0	96.3
Hardwood										
Sawnwood & Sleepers	4.9	5.1	9.3	9.0	7.5	7.1	6.4	5.5	5.3	4.3
Solidwood Panels	1.1	1.5	6.4	6.6	7.3	6.8	6.9	4.3	6.5	3.6
Reconstituted Panels	0.5	0.5	1.9	1.7	2.6	2.6	2.7	2.7	2.9	2.9
Other Ind. Products	1.9	1.8	0.9	0.8	0.2	0.1	0.2	0.1	0.2	0.1
Pulps	4.7	4.5	17.4	16.2	21.5	19.1	29.5	24.4	41.9	29.6
TOTAL HARDWOOD	13.1	13.4	35.9	34.3	39.1	35.7	45.7	37.0	56.8	40.5
Total Softwood & Hardwood										
Sawnwood & Sleepers	26.5	26.5	44.1	41.5	44.6	41.4	52.0	47.6	53.8	48.7
Solidwood Panels	1.1	1.5	6.4	6.6	7.3	6.8	7.6	5.0	8.0	4.8
Reconstituted Panels	0.7	0.7	2.6	2.3	5.0	5.0	8.4	8.4	11.8	11.8
Other Ind. Products	5.3	5.1	2.5	2.2	1.3	1.2	1.2	1.1	1.2	1.1
Pulps	13.2	12.2	33.1	28.2	43.8	38.6	63.7	52.5	94.0	70.4
TOTAL	46.8	46.0	88.7	80.8	102.0	93.0	132.9	114.6	168.8	136.8

LATIN AMERICA

6.0 LATIN AMERICA

Latin America's primary industrial product from wood fibers has historically been sawnwood. Beginning in the early 1980's, however, the production of pulp products should become the most important industrial use of Latin America's fiber. Table 6.0 shows the expected consumption and production of fiber-containing products. Compared with 60% of the produced product volume in 1960, sawnwood products are expected to fall to only 28% in 2000. Pulp products, by comparison, are expected to rise from a mere 22% in 1960 to 52% in 2000.

Both softwood and hardwood products are projected to grow markedly during the study period. Softwood-containing products are expected to rise from 8.8 million cbm in 1960 to 46.1 million cbm in 2000, an annual rate of 4.2%. Hardwood products are projected to rise almost as rapidly, up from 11.2 million cbm to 50.4 million cbm for an annual growth rate of 3.8%.

Fiber exports are expected to become a major factor in Latin America's economy. As the region has become increasingly industrialized, self-sufficiency is shifting towards a net export posture. The region is projected to be a net exporter of manufactured products in 1980, primarily 0.4 million cbm of pulp. By the year 2000, the region is expected to be a net exporter of roughly 3 million cbm of solidwood products and 4 million cbm of pulp.

6.1 SAWNWOOD & SLEEPERS

Consumption of sawnwood in Latin America is expected to grow at a modest pace. The Working Party estimates that consumption between 1960 and 1980 will rise from 12.0 million cbm to 17.2 million cbm, a 1.8% annual rate. Continuing industrialization and an expanded domestic sawlog supply are expected to increase that growth slightly to a 2.2% level for the balance of this century. Consumption of hardwood sawnwood is expected to grow at a 2.8% rate, up from 2.2% in the 1960-1980 period. Softwood sawnwood, on the other hand, is expected to grow very slowly until 1990, then accelerate markedly as new sawlog supply becomes available in Brazil and Chile. Brazil's consumption, for example, is estimated not to return to the 3.0 million cbm level until 1990 - despite apparent consumption of 3.4 million cbm in 1970.

Latin America's self-sufficiency in sawnwood is expected to begin shifting toward a net export posture in the early 1980's. By 1990 the region is projected to be exporting 12% of its softwood sawnwood production. This is expected to rise to about 20% by 2000. Some net exports of hardwood sawnwood are also projected but on a much smaller scale because of limited overseas demand.

6.2 WOOD-BASED PANELS

Panel products are a growing factor in Latin America's consumption of wood fibers. Compared with only 0.6 million cbm in 1960, they are estimated to be 4.0 million cbm in 1980 and 9.0 million cbm in 2000. Thus annualized growth is projected to decline from 10.0% in the 1960-80 period to a 4.1% level between 1980 and 2000. The development of Latin America's panel business is expected to follow a different path from other world regions. Consumption of solidwood panels is projected to grow more rapidly than reconstituted wood panels. Their annualized growth rate between 1980 and 2000 is estimated at 5.9% compared with only 2.4% for reconstituted panels. This differential growth rate is expected because the Working Party expects a hardwood plywood industry to emerge in tropical Latin America. Hardwoods should accordingly constitute the region's major fiber component for panels, gradually increasing their share of fiber in panels produced from 68% in 1980 to 74% by 2000. Brazil is projected to be the region's leading producer representing roughly half of Latin America's production by the year 2000.

Latin America's exports of panel products are expected to grow during the 1980-2000 period. The region is currently exporting about 0.1 million cbm or roughly 7% of its production as high quality plywood or sliced veneer, primarily from the Amazon basin. This volume is expected to grow to approximately 0.3 million cbm by 2000. Self-sufficiency is expected to remain relatively constant, however, because domestic consumption of solid hardwood panels is also expected to triple. A modest volume of exports in reconstituted panels is also projected as the region's industry couples its low cost fiber with competitive panel technology.

6.3 OTHER INDUSTRIAL PRODUCTS

Consumption of other industrial products is expected to continue growing in Latin America but at a markedly reduced rate. Compared with 4.9% in the 1960-80 period, growth of this product category between 1980 and 2000 is expected to average only 1.7%. This expected decline arises because growth within this product category has dropped markedly since the mid-1960's, and the Working Party has been unable to identify any basis for projecting an increase in the usage factor. Hardwoods are projected to continue representing roughly 90% of the other industrial products. Because the products in this category are primarily produced for local consumption, there is no significant trade projected so self-sufficiency should remain at 100%.

6.4 WOOD PULPS

Fiber consumption for wood pulps in Latin America is projected to exhibit significant growth during the next two decades. In absolute terms, the region's use of fiber for pulp manufacturing is expected to increase from 15.6 to 54.0 million cbm in the 1980-2000 period, up from 2.7 million cbm in 1960.

The bulk of the region's growth in pulp fiber usage is expected to be in the area of white chemical pulp. Although high yield pulps are projected to grow faster, white chemical pulp is still expected to represent at least about 60% of the region's pulpwood consumption in 2000. Brazil is expected to be the dominant producer of both softwood and hardwood pulps, although Chile is expected to become an increasingly important producer of softwood pulps. After reviewing the region's fiber availability, the Working Party has reassessed its evaluation of the region's chemical pulps and shifted the product mix shown in Phase III toward increasing softwood supply.

The region's growth in fiber consumption for the production of white pulp is expected to slow from 8.5% in the 1960-80 period to 6.5% between 1980 and 2000. This projected 6.5% rate, however, is faster than that forecast for white pulp in any region except the Other Eastern Hemisphere.

This slower growth than the Other Eastern Hemisphere region is related to pulp production, not consumption. Tables 6.0 and 7.0 show that the consumption of pulp fibers in Latin America is projected to grow faster than other areas of the Southern Hemisphere. Its growth of softwood pulps, both production and consumption is expected to eclipse that of the Other Eastern Hemisphere. The Working Party has estimated that Latin America will continue throughout this century as the Southern Hemisphere's leading producer and exporter of softwood chemical pulps. It has, however, modified its view presented in Phase III about hardwoods.

The revised hardwood pulp outlook differs in the areas of production and exports. Africa, Oceania and the Far East are now expected to grow at a faster rate in production and exports of hardwood pulps as Latin America focusses more on softwoods. The region's afforestation, infrastructure and pulp mill construction programs are proving to be an expensive approach to creating white hardwood pulp for export. The Working Party has carefully appraised the potential yield from existing afforestation opportunities for pulp production. The Working Party expects the future impetus behind this effort to be much lower than in the 1970's. Because Africa, Oceania and the Far East are projected to have substantial hardwood resources near tidewater locations, the Working Party anticipates a major shift toward those regions during the 1990's as the world's suppliers of hardwood chemical pulps.

Latin America is expected to remain basically in balance for its other pulp requirements (except for minimal imports of dissolving pulp). Thus by 2000, overall self-sufficiency is estimated to be about 108% with white chemical pulp constituting the only pulp product to be exported.

TABLE 6.0

LATIN AMERICA

OUTLOOK FOR WOOD PRODUCTS

(Millions of Cubic Meters)

	1960		1970		1980		1990		2000	
	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.
Softwood										
Sawnwood & Sleepers	5.3	5.5	7.5	7.8	6.9	6.9	7.3	8.3	9.0	11.5
Solidwood Panels	0.1	0.1	0.3	0.3	0.4	0.4	0.6	0.6	0.9	0.9
Reconstituted Panels	0.1	0.1	0.5	0.5	0.9	0.9	1.1	1.3	1.4	1.5
Other Ind. Products	0.3	0.3	0.6	0.6	0.7	0.7	0.9	0.9	1.0	1.0
Pulps	3.0	1.4	6.7	4.3	9.1	7.8	17.4	19.0	33.8	36.8
TOTAL SOFTWOOD	8.8	7.4	15.6	13.5	18.0	16.7	27.3	30.1	46.1	51.7
Hardwood										
Sawnwood & Sleepers	6.7	6.8	8.0	8.3	10.3	10.4	14.7	14.9	17.8	18.2
Solidwood Panels	0.3	0.3	0.5	0.6	1.3	1.4	2.5	2.7	4.4	4.7
Reconstituted Panels	0.1	0.1	0.8	0.9	1.4	1.3	2.0	2.1	2.3	2.3
Other Ind. Products	2.6	2.7	5.7	5.7	6.8	6.8	8.1	8.1	9.5	9.5
Pulps	1.5	1.3	4.2	4.0	6.1	7.8	9.9	13.1	16.4	17.2
TOTAL HARDWOOD	11.2	11.2	19.2	19.5	25.9	27.7	37.2	40.9	50.4	51.9
Total Softwood & Hardwood										
Sawnwood & Sleepers	12.0	12.3	15.5	16.1	17.2	17.3	22.0	23.2	26.8	29.7
Solidwood Panels	0.4	0.4	0.8	0.9	1.7	1.8	3.1	3.3	5.3	5.6
Reconstituted Panels	0.2	0.2	1.3	1.4	2.3	2.2	3.1	3.4	3.7	3.8
Other Ind. Products	2.9	3.0	6.3	6.3	7.5	7.5	9.0	9.0	10.5	10.5
Pulps	4.5	2.7	10.9	8.3	15.2	15.6	27.3	32.1	50.2	54.0
TOTAL	20.0	18.6	34.8	33.0	43.9	44.4	64.5	71.0	96.5	103.6

OTHER EASTERN HEMISPHERE

7.0 OTHER EASTERN HEMISPHERE

The Other Eastern Hemisphere region is composed of four sub-regions: Oceania, the Middle East and North Africa, Africa South of the Sahara, and the Far East. Discussion of aggregates for the region can be misleading, particularly with respect to Oceania. Nonetheless, it is appropriate to view the region as a current producer and consumer of solidwood products which has the potential for translating its unused fiber base into a major pulp business. In 1960, for example, only 7% of the region's domestic consumption of fiber was in the form of wood pulps. By 1980 and 2000, that percentage is projected to increase to 19% and 29% respectively. Thus growth in the region's pulp and paper sectors is projected to far outstrip its growth in the area of solidwood products. Table 7.0 shows the Working Party's estimates for consumption and production in this region.

The methodology used to develop this outlook has varied widely from product to product and country to country. In general, the Working Party has examined consumption in light of historical population and economic factors, relating them to perceived trends and possible changes in supply. Although the outlooks thus developed are particularly subjective, the Working Party has felt that the quality of this region's underlying statistics for most countries does not justify an intense effort to develop derived demand relationships. The statistics for many developing countries in the region are based on consumption estimates rather than reports, particularly those for "other industrial roundwood" products which have historically constituted close to half of the region's total fiber consumption. Accordingly, the Working Party has relied more on empirical observations rather than analytical calculations for much of the assumptions which underlie this region's outlook.

Self-sufficiency within the region is expected to improve markedly during the 1980-2000 period. Historically it has been a deficit region for fiber products. Although its has developed a trade in hardwood sawnwood and panels, its net imports of softwood sawnwood have offset its hardwood products exports. A similar softwood/hardwood pattern has existed in the area of chemical pulps. The region's balance for sawnwood, panels and pulp products, however, is expected to shift to a net export posture by 1990.

7.1 SAWNWOOD AND SLEEPERS

Consumption of sawnwood and sleepers in the Other Eastern Hemisphere region is expected to grow in the 1980-2000 period at a slightly increased pace (3.6%) above the 3.0% rate estimated for 1960-80. This increased pace is forecast because of the projected growth in the Far East which already accounts for more than half of the region's sawnwood consumption. Consumption in the Far East region should show the most rapid growth in both absolute and percentage terms.

Hardwoods predominate in this region, and softwoods accordingly have much less impact than they do in the industrialized nations of the temperate zone. Hardwood sawnwood is expected to gain share throughout the forecast period, rising from 64% of sawnwood consumed in 1960 to 68% and 73% in 1980 and 2000 respectively. The region's self-sufficiency in sawnwood is expected to rise from 91% in 1960 to 99% in 1980 and 104% in 2000. Softwood sawnwood consumption, however, is expected to exceed production throughout the forecast period.

7.1.1 OCEANIA

Sawnwood consumption in Oceania in recent years has grown at an annualized rate of only 0.5%. The outlook for the 1980-2000 period is no brighter. Softwood sawnwood consumption is expected to increase at a 1.7% annual rate during the latter period, but hardwood is expected to continue its decline. The rationale underlying this low consumption forecast relates to this sub-region's population and economic growth. Consumption has been growing at a rate below 1% per annum since 1960 in a period when population growth was almost 2% and real economic growth over 4%. The Working Party's outlook for both population and economic growth is lower during the next two decades. Only an enhanced potential for self-sufficiency has kept the Working Party from forecasting a negative growth for total sawnwood in the future.

Self-sufficiency should improve in Oceania as this sub-region's softwood plantations mature. During the 1990's Oceania is expected to shift from importing softwood sawnwood to being a major exporter of radiata pine lumber. By 2000 its net exports are estimated to reach 2.8 million cbm which will represent an estimated self-sufficiency level of 154% (see Table 7.0.1).

7.1.2 MIDDLE EAST AND NORTH AFRICA

Consumption of sawnwood in this sub-region is projected to continue rising but at a slightly reduced rate. Compared with the 3.0% growth rate of the 1960-80 period, a 2.4% growth rate is expected between 1980 and 2000. Softwood sawnwood is projected to constitute the bulk of consumption, rising from 3.0 million cbm in 1980 to 5.0 million cbm in 2000. Hardwood sawnwood is expected to increase from 0.6 to 0.8 million cbm during that period.

In developing its estimate for the Middle East and North Africa, the Working Party has attempted to integrate the pragmatic issues of economic and political turmoil with the region's potential for real economic growth. This sub-region is one of the most politically restless in the world. Some of the region's recent imports have ended up in stockpiles rather than consumption. Although countries such as Egypt and Israel could show exceptional growth if tensions ease permanently, the Working Party has reduced the region's outlook below its theoretical potential to reflect some continuation of its political unrest.

Self-sufficiency is expected to remain roughly stable as imports of softwood sawnwood rise. This sub-region has for decades been a major net importer of softwood sawnwood, primarily from the USSR. Some increased production of softwood is expected as North African plantations augment the sub-region's supply of sawlogs. Table 7.0.2 shows that consumption is projected to rise even faster so that self-sufficiency for all sawnwood should fall from an estimated 17% in 1980 to about 15% by 2000.

7.1.3 AFRICA SOUTH OF THE SAHARA

Sawnwood consumption in Africa South of the Sahara is projected to grow for the balance of this century at a rate of 2.9%. This rate is lower than the 4.3% rate expected for the 1960-80 period primarily because the sub-region's economic growth is expected to decline from 4.9% to 4.1% in those two periods. Softwood sawnwood is expected to increase most rapidly, rising 3.1% annually, from 2.0 to 3.7 million cbm between 1980 and 2000. Hardwood sawnwood and sleepers are projected to grow at a 2.8% rate, up from 4.0 to 7.0 million cbm during that period. Within that category wooden sleepers are projected to decline 2-3% per annum due to the rapid substitution of cement ties.

Table 7.0.3 shows that self-sufficiency is expected to decline modestly from 103% in 1980 to 100% by 2000. Sawn softwood is projected to shift from a balanced position to small deficit because South Africa's production is not expected to keep pace with the sub-region's consumption. Self-sufficiency in hardwood sawnwood is projected to remain somewhat over 100 % during the forecast period but net imports of sleepers should partially offset that surplus.

7.1.4 FAR EAST

Consumption of sawnwood is expected to rise from an estimated 17.5 million cbm in 1980 to 44.6 million cbm in 2000. This implies an annual growth of 4.8% per annum between 1980 and 2000 compared to 4.1% per annum from 1960 to 1980. The bulk of this growth is forecast to be in hardwood sawnwood, the consumption of which is projected to rise from 15.2 million cbm in 1980 to 40.1 million cbm in 2000. The consumption of sleepers is not expected to grow.

This forecast of increased consumption can be misleading. An important part of this apparent increase is attributable to a changed method of calculating consumption. This new approach results in a greater part of the actual consumption of sawnwood being included in official government and FAO statistics. The Working Party believes that present consumption figures in many countries of this sub-region still underestimate real consumption. This problem is particularly believed to apply to the less valuable species and grade assortments because of difficulties in recording and controlling the trade of these items.

There are also, however, several reasons why the Working Party expects a significant real increase in actual consumption. The primary reason is a bullish forecast for population and GNP growth. Other reasons include: increased sawnwood production for export (which will create a greater availability especially in fall down sizes and grades), increased availability from plantations in such heavy consumer countries as India and the Republic of Korea, and generally increased concern for and ability to pay for housing in the region.

The methodology used to develop this outlook has varied from country to country. Whereas certain ASEAN countries have provided sophisticated demand projections, the Far Eastern Working Group has been forced to rely on mere trend projections and considered estimates for other countries in the vast Far Eastern region. Table 7.0.4 summarizes the Working Party's consumption and production estimates for the Far East.

The Far East sub-region is a net exporter of hardwood sawnwood. Net exports are projected to expand from an estimated 3.1 million cbm in 1980 to 4.2 million cbm in 2000. The self-sufficiency ratio for hardwood sawnwood should decline from 120% in 1980 to 110% in 2000. In softwoods the sub-region's growth in sawnwood consumption is projected to exceed its growth in production capability. There is a small volume of softwood sawnwood exported to Japan, primarily from the Republic of Korea, and this volume is expected to remain in the range of 0.2 million cbm during the forecast period.

7.2 WOOD-BASED PANELS

Wood-based panels in the Other Eastern Hemisphere have represented an increasing portion of the region's fiber consumption. During the 1960-80 period they are estimated to have risen from 1.7% to 7.6% of the region's total fiber consumption. During the next two decades, however, this share increase is expected to stop growing significantly. By year

2000, panels are projected to be only 8.4% of the region's fiber consumption. Solidwood panels are expected to be the leading panel component consumed within this region, up from 50% in 1980 to 62% by 2000. Hardwoods should continue to predominate in both solidwood and reconstituted panels, growing from 77% in 1980 to 83% in 2000.

Within the region, the Far East is expected to surpass Oceania as the leading consumer of panels. Consumption in the Far East has been small and limited primarily to hardwood plywood. Growth in consumption of solidwood panels, however, has been rapid, rising an estimated 12.3% in the 1970-80 period. This growth is expected to decline but still maintain a level of 5.2% which slightly exceeds the Far East's estimated economic growth. As with sawnwood, supply constraints and increased prices are expected to restrict the growth in consumption. Consumption of reconstituted panels in the Far East is also expected to rise but from a very small base of 0.4 million cbm in 1980 to 0.6 million cbm in 2000. Consumption of panel products in the other sub-regions of the Other Eastern Hemisphere region is expected to be of less importance, rising at an annualized rate of 3.2%, from 5.4 to 10.1 million cbm between 1980 and 2000.

The region's self-sufficiency in panels is expected to continue in the 160% range for the next two decades. Net exports are expected to double from 4.3 to 8.6 million cbm during the 1980-2000 period. The bulk of this growth is again projected for the Far East region in hardwood plywood and veneer. About half of the Far East's exports are expected to go to Japan with the rest destined for other world markets, the Mid-East, Europe and North America. The region's self-sufficiency in 2000 could, however, be somewhat higher. During the 1990's a strong competitive bidding is anticipated for the Far East's plywood and veneer as its supply of hardwood peeler logs levels off. This could result in a lower level of log exports than the 9.2 million cbm which the Working Party has estimated for the year 2000. Because a strong world-wide demand for hardwood panels is forecast at that time, ASEAN sawlog producers may insist on a higher proportion of domestic conversion than the Working Party has estimated.

7.3 OTHER INDUSTRIAL PRODUCTS

This category in FAO's statistics covers a variety of end uses from poles and piling to localized consumption of roundwood by villagers for traditional construction uses. The Working Party believes that this latter end-use will begin growing more slowly as more sawnwood enters into local markets. By 2000 consumption of other industrial products in the Other Eastern Hemisphere region is projected to grow only to 42.4 million cbm, up less than 1% annually from 1960's 29.1 million cbm. The bulk of this growth is expected to be in hardwoods. Consumption of hardwood products should rise from 27.9 million cbm in 1960 to 35.9 million cbm in 1980 and 40.2 million cbm in 2000. Softwood products are projected to rise from 1.2 million cbm in 1960 to 1.8 and 2.2 million cbm in 1980 and 2000 respectively.

As noted in paragraph 2.4, this product category contains some weak statistics. The forecasts of consumption which are based upon them should be viewed as speculative. The sub-regions which have a high proportion of their total fiber consumption in this category, however, tend to be wood rich. Thus estimates of their future consumption could err widely without impacting on global trade patterns. If the wood is needed for consumption, local forests will supply it. For the above reasons, the Working Party has deliberately avoided trying to refine these estimates beyond inspecting the historical base for possible approaches to improving the consumption estimates.

7.4 WOOD PULPS

The Other Eastern Hemisphere's consumption of fiber for the production of wood pulps is expected to continue growing more rapidly than for any other region, but at a reduced rate. Compared with an annualized growth rate between 1960 and 1980 of 9.6%, the rate projected for 1980 to 2000 is 7.8%. Both softwoods and hardwoods are expected to increase markedly with softwoods growing at a 7.0% rate and hardwoods compounding at 8.6%. The fastest growing sub-regions are projected to be the Middle East and North Africa (10.3%) and the Far East (9.4%), although Oceania (7.4%) and Africa South of the Sahara (6.2%) are still expected to exceed the growth of the industrialized economies. Since pulp consumption through 1990 has previously been estimated in Phases II and III, this discussion will particularly focus on self-sufficiency and interregional competition for world markets.

7.4.1 OCEANIA

Oceania's afforestation program is projected to support a major pulp and paper industry expansion during the next two decades. The region has extensive plantations of eucalyptus and radiatta pine which can serve as the fiber base for new capacity. Production of softwood-containing pulps, estimated at 4.5 million cbm in 1980, should rise to about 17.1 million cbm by 2000, a 6.9% annualized rate. Hardwood pulps should increase at a 9.6% yearly rate, up from 0.8 million cbm to 5.0 million cbm during that period. The bulk of the increase in both cases is expected to be in the chemical pulp categories, particularly white pulp for export.

Oceania is currently a net importer of fiber-based pulps. Its self-sufficiency in 1960 was only 72%; it is currently in the 85% range. By 1990, however, the region should have swung to a net export posture with net exports rising to about 900,000 tons of white chemical pulp in the year 2000. This equates to a net export of roughly 4.6 million cbm and implies a self-sufficiency level of 126%!

7.4.2 MIDDLE EAST AND NORTH AFRICA

Consumption of fiber for wood pulps in the Middle East and North Africa is expected to explode during the next two decades, albeit from a relatively low base. Iran is expected to lead the sub-region's growth as it makes new capacity investments for hardwood near the Caspian Sea. A modest growth is also foreseen for softwood capacity in North Africa. White chemical pulp is projected to show a dramatic growth in consumption as literacy rises in response to the educational programs of several oil-rich nations.

The Working Party foresees a continuing wood pulp deficit, however, within this region. Because of its historical trade patterns and its widely based geographic centers, a considerable influx of pulp products appears likely throughout the next two decades. Thus, although self-sufficiency for a few countries such as Iran should exceed 100% by the turn of the century, overall self-sufficiency is expected to reach only 85%. This is, however, up markedly from an estimated 57% in 1980.

7.4.3 AFRICA SOUTH OF THE SAHARA

Africa South of the Sahara's growth in pulp fiber consumption is expected to be export led. This sub-region has since the 1960's been a net exporter of fiber in the form of chemical pulps. In 1980, these exports are expected to be 1.3 million cbm, representing 26% of the sub-region's 5.0 million cbm of wood fiber consumed in the production of pulps. By 2000, however, these exports are projected to rise to 8.0 million cbm or 48% of the region's consumption. Thus self-sufficiency should rise from an estimated 135% in 1980 to 192% in 2000!

Two crucial assumptions underlie this estimated growth. The first assumption relates to the growing needs of industrialized nations, particularly Western Europe, for increased supplies of chemical pulp. The second assumption projects that Africa, not Latin America will be the fastest growing exporter of chemical pulp products, particularly those which are hardwood based. The reasons underlying this assumption for hardwoods relate primarily to the potential availability of tidewater sites with adequate process water and infrastructure to support new capacity.

The Working Party has used the FAO's information bulletin on future pulp capacity, Projected Pulp and Paper Mills in the World, 1977-87, FAO, 1978, as a guide in considering the region's potential to provide efficient mill sites. There are several countries in Africa such as Cameroon, Gabon, Ivory Coast and Nigeria which have the physical potential to support new mill sites. The

Working Party has assumed that capital will ultimately flow to these locations to support their industrialization. Afforestation efforts for hardwoods are expected to slow in Latin America as the economic consequences unfold for Brazil's leap into world export markets. If Latin America's current plantation efforts do diminish as expected during the 1980's these countries could afford potentially interesting investment opportunities. The reader should note, however, that Latin America also has extensive stands of mixed tropicals which might provide a greater competition for funds than the Working Party has anticipated.

7.4.4 FAR EAST

The Far East's consumption of fibers for pulp production is expected to grow at a 9.4% annualized rate during the 1980-2000 period. Consumption of fibers for pulp production should rise from 0.2 million cbm in 1960 to 3.8 million cbm in 1980 to 22.8 million cbm in 2000. The bulk of this requirement will be in hardwoods (16.8 million cbm) but a significant consumption of softwoods is projected as well (6.0 million cbm). One unusual feature of the sub-region's pulp furnish is the use of hardwood fibers such as falcata in its production of mechanical pulps.

Underlying this consumption outlook is an expected shift within the region toward a net export posture after 1990. Domestic consumption of pulps has been growing rapidly, and a 5.1% growth rate is projected for the 1980-2000 period. The Far East is expected to become a net exporter of hardwood chemical pulps around 1980. This sub-region is forecast to have extensive by-product residuals available because of its projected growth in solidwood products. Nonetheless some of the fiber needed to support the 1990-2000 pulp production surge will probably need to come from chipping of mixed tropical hardwoods from economically accessible locations such as river sites in Indonesia. Because the Far East is projected to have limited quantities of softwood fibers, however, it should still be a net importer of softwood pulps in the future.

TABLE 7.0

OTHER EASTERN HEMISPHERE

OUTLOOK FOR WOOD PRODUCTS

(Millions of Cubic Meters)

	1960		1970		1980		1990		2000	
	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.
Softwood										
Sawnwood & Sleepers	6.7	4.3	9.0	6.5	11.0	8.3	14.4	11.1	18.4	16.9
Solidwood Panels	-	-	-	-	0.1	0.1	0.1	0.1	0.2	0.2
Reconstituted Panels	0.2	0.2	0.8	0.7	1.6	1.6	1.9	1.9	2.3	2.3
Other Ind. Products	1.2	1.2	1.5	1.5	1.8	1.8	1.9	1.9	2.2	2.2
Pulps	2.9	1.8	7.9	4.9	12.3	7.9	20.5	15.7	32.8	30.8
TOTAL SOFTWOOD	11.1	7.5	19.2	13.6	26.8	19.7	38.8	30.7	55.9	52.4
Hardwood										
Sawnwood & Sleepers	11.9	12.8	16.4	18.3	22.9	25.4	38.6	42.5	50.2	54.2
Solidwood Panels	0.4	0.9	1.2	3.1	3.6	8.3	6.4	13.8	9.1	17.5
Reconstituted Panels	0.3	0.4	1.0	1.2	2.1	1.7	2.7	2.3	3.5	3.7
Other Ind. Products	27.9	27.9	32.8	32.5	35.9	35.9	37.5	37.5	40.2	40.1
Pulps	0.8	0.6	2.2	2.7	6.2	7.0	10.1	16.2	19.8	36.5
TOTAL HARDWOOD	41.3	42.6	53.6	57.8	70.7	78.3	95.3	112.3	122.8	152.0
Total Softwood & Hardwood										
Sawnwood & Sleepers	18.7	17.1	25.4	24.8	33.9	33.7	53.0	53.6	68.6	71.1
Solidwood Panels	0.4	0.9	1.2	3.1	3.7	8.4	6.5	13.9	9.3	17.7
Reconstituted Panels	0.5	0.6	1.8	1.9	3.7	3.3	4.6	4.2	5.8	6.0
Other Ind. Products	29.1	29.1	34.3	34.0	37.7	37.7	39.4	39.4	42.4	42.3
Pulps	3.7	2.4	10.1	7.6	18.5	14.9	30.6	31.9	52.5	67.3
TOTAL	52.4	50.1	72.8	71.4	97.5	98.0	134.1	143.0	178.7	204.4

TABLE 7.0.1
OCEANIA

OUTLOOK FOR WOOD PRODUCTS

(Millions of Cubic Meters)

	1960		1970		1980		1990		2000	
Softwood	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.
Sawnwood & Sleepers	2.9	2.3	3.0	2.7	3.7	3.3	4.4	4.3	5.2	8.0
Solidwood Panels	-	-	-	-	0.1	0.1	0.1	0.1	0.1	0.2
Reconstituted Panels	0.1	0.1	0.7	0.6	1.4	1.4	1.7	1.7	2.0	2.0
Other Ind. Products	0.1	0.1	0.4	0.4	0.5	0.5	0.4	0.4	0.4	0.4
Pulps	2.0	1.4	3.3	2.5	5.0	4.5	8.5	8.3	14.3	17.1
TOTAL SOFTWOOD	5.1	3.9	7.4	6.2	10.7	9.8	15.1	14.8	22.0	27.7
Hardwood										
Sawnwood & Sleepers	3.3	3.1	3.2	2.9	3.1	2.7	2.6	2.6	2.3	2.5
Solidwood Panels	0.1	0.1	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3
Reconstituted Panels	0.1	0.2	0.1	0.2	0.3	0.3	0.3	0.3	0.3	0.3
Other Ind. Products	0.9	0.9	0.7	0.7	0.7	0.7	0.6	0.6	0.6	0.6
Pulps	0.5	0.4	0.8	0.6	1.1	0.8	1.8	2.3	3.2	5.0
TOTAL HARDWOOD	4.9	4.7	5.0	4.6	5.4	4.7	5.6	6.1	6.7	8.7
Total Softwood & Hardwood										
Sawnwood & Sleepers	6.2	5.4	6.2	5.6	6.8	6.0	7.0	6.9	7.5	10.5
Solidwood Panels	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.4	0.5
Reconstituted Panels	0.2	0.3	0.8	0.8	1.7	1.7	2.0	2.0	2.3	2.3
Other Ind. Products	1.0	1.0	1.1	1.1	1.2	1.2	1.0	1.0	1.0	1.0
Pulps	2.5	1.8	4.1	3.1	6.1	5.3	10.3	10.6	17.5	22.1
TOTAL	10.0	8.6	12.4	10.8	16.1	14.5	20.7	20.9	28.7	36.4

TABLE 7.0.2

MIDDLE EAST & NORTH AFRICA

OUTLOOK FOR WOOD PRODUCTS

(Millions of Cubic Meters)

	1960		1970		1980		1990		2000	
	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.
Softwood										
Sawnwood & Sleepers	1.7	0.3	2.4	0.4	3.0	0.4	3.9	0.5	5.0	0.7
Solidwood Panels	-	-	-	-	-	-	-	-	0.1	-
Reconstituted Panels	-	-	-	-	-	-	-	-	-	-
Other Ind. Products	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Pulps	0.1	-	0.4	-	0.7	-	1.8	-	3.2	0.8
TOTAL SOFTWOOD	2.0	0.5	3.0	0.6	3.9	0.6	5.9	0.7	8.5	1.7
Hardwood										
Sawnwood & Sleepers	0.3	0.1	0.6	0.3	0.6	0.2	0.6	0.2	0.8	0.2
Solidwood Panels	0.1	-	0.2	0.2	1.0	0.4	1.8	1.1	2.5	1.6
Reconstituted Panels	-	-	0.3	0.3	0.6	0.3	0.9	0.5	1.1	0.9
Other Ind. Products	5.7	5.6	6.0	5.8	6.3	6.2	6.3	6.2	6.4	6.2
Pulps	0.1	0.1	0.2	0.2	0.7	0.8	1.3	2.2	3.6	4.9
TOTAL HARDWOOD	6.2	5.8	7.3	6.8	9.2	7.9	10.9	10.2	14.4	13.8
Total Softwood & Hardwood										
Sawnwood & Sleepers	2.0	0.4	3.0	0.7	3.6	0.6	4.5	0.7	5.8	0.9
Solidwood Panels	0.1	-	0.2	0.2	1.0	0.4	1.8	1.1	2.6	1.6
Reconstituted Panels	-	-	0.3	0.3	0.6	0.3	0.9	0.5	1.1	0.9
Other Ind. Products	5.9	5.8	6.2	6.0	6.5	6.4	6.5	6.4	6.6	6.4
Pulps	0.2	0.1	0.6	0.2	1.4	0.8	3.1	2.2	6.7	5.7
TOTAL	8.2	6.3	10.3	7.4	13.1	8.5	16.8	10.9	22.9	15.5

TABLE 7.0.3

AFRICA SOUTH OF THE SAHARA

OUTLOOK FOR WOOD PRODUCTS

(Millions of Cubic Meters)

	1960		1970		1980		1990		2000	
	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.
Softwood										
Sawnwood & Sleepers	1.1	0.7	1.7	1.4	2.0	2.0	2.8	2.8	3.7	3.5
Solidwood Panels	-	-	-	-	-	-	-	-	-	-
Reconstituted Panels	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.3	0.3
Other Ind. Products	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2
Pulps	0.4	0.3	2.0	2.1	2.4	2.7	3.9	4.9	6.0	6.9
TOTAL SOFTWOOD	1.7	1.2	3.9	3.7	4.8	5.1	7.1	8.1	10.2	10.9
Hardwood										
Sawnwood & Sleepers	1.5	1.8	2.6	2.9	4.0	4.2	5.6	5.7	7.0	7.2
Solidwood Panels	-	0.2	0.3	0.6	0.8	1.1	1.5	1.9	1.9	2.4
Reconstituted Panels	0.1	0.1	0.3	0.4	0.8	0.7	1.1	1.1	1.5	1.9
Other Ind. Products	11.6	11.6	15.5	15.5	17.8	17.8	19.1	19.1	21.0	21.0
Pulps	-	-	0.5	1.4	1.3	2.3	1.8	4.7	2.7	9.8
TOTAL HARDWOOD	13.2	13.7	19.2	20.8	24.7	26.1	29.1	32.5	34.1	42.3
Total Softwood & Hardwood										
Sawnwood & Sleepers	2.6	2.5	4.3	4.3	6.0	6.2	8.4	8.5	10.7	10.7
Solidwood Panels	-	0.2	0.3	0.6	0.8	1.1	1.5	1.9	1.9	2.4
Reconstituted Panels	0.2	0.2	0.4	0.5	1.0	0.9	1.3	1.3	1.8	2.2
Other Ind. Products	11.7	11.7	15.6	15.6	18.0	18.0	19.3	19.3	21.2	21.2
Pulps	0.4	0.3	2.5	3.5	3.7	5.0	5.7	9.6	8.7	16.7
TOTAL	14.9	14.9	23.1	24.5	29.5	31.2	36.2	40.6	44.3	53.2

TABLE 7.0.4

FAR EAST

OUTLOOK FOR WOOD PRODUCTS

(Millions of Cubic Meters)

	1960		1970		1980		1990		2000	
	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.
Softwood										
Sawnwood & Sleepers	1.0	1.0	1.9	2.0	2.3	2.6	3.3	3.5	4.5	4.7
Solidwood Panels	-	-	-	-	-	-	-	-	-	-
Reconstituted Panels	-	-	-	-	-	-	-	-	-	-
Other Ind. Products	0.8	0.8	0.8	0.8	0.9	0.9	1.1	1.1	1.4	1.4
Pulps	0.5	0.1	2.3	0.3	4.2	0.7	6.3	2.5	9.4	6.0
TOTAL SOFTWOOD	2.3	1.9	5.0	3.1	7.4	4.2	10.7	7.1	15.3	12.1
Hardwood										
Sawnwood & Sleepers	6.8	7.8	10.0	12.2	15.2	18.3	29.8	34.0	40.1	44.3
Solidwood Panels	0.2	0.6	0.5	2.1	1.6	6.6	2.8	10.5	4.4	13.2
Reconstituted Panels	0.1	0.1	0.3	0.3	0.4	0.4	0.4	0.4	0.6	0.6
Other Ind. Products	9.7	9.8	10.6	10.5	11.1	11.2	11.5	11.6	12.2	12.3
Pulps	0.2	0.1	0.7	0.5	3.1	3.1	5.2	7.0	10.2	16.8
TOTAL HARDWOOD	17.0	18.4	22.1	25.6	31.4	39.6	49.7	63.5	67.5	87.2
Total Softwood & Hardwood										
Sawnwood & Sleepers	7.8	8.8	11.8	14.2	17.5	20.9	33.1	37.5	44.6	49.0
Solidwood Panels	0.2	0.6	0.5	2.1	1.6	6.6	2.8	10.5	4.4	13.2
Reconstituted Panels	0.1	0.1	0.3	0.3	0.4	0.4	0.4	0.4	0.6	0.6
Other Ind. Products	10.5	10.6	11.4	11.3	12.0	12.1	12.6	12.7	13.6	13.7
Pulps	0.7	0.2	3.0	0.8	7.3	3.8	11.5	9.5	19.6	22.8
TOTAL	19.3	20.3	27.0	28.7	38.8	43.8	60.4	70.6	82.8	99.3

CENTRALLY PLANNED

8.0 CENTRALLY PLANNED ECONOMIES

The FAO's statistics for much of the production and consumption within the Centrally Planned Economies are extremely diverse in their accuracy. The statistics for Eastern Europe do seem quite precise. Those for the U.S.S.R. are less satisfactory while the Asia Centrally Planned statistics leave a significant basis for questions. The major question underlying the U.S.S.R. statistics relates to the category of other industrial roundwood. The difficulty associated with Centrally Planned Asia encompasses the entire statistical base.[1]

Consumption of wood products in the Centrally Planned Economies is projected to continue growing in the 1980-2000 period but at a somewhat reduced rate. Compared with an estimated 1.9% annual rate in the 1960-80 period, consumption growth is expected to decline to 1.7% annually. The Soviet Union is projected to continue as the major wood consumer within the Centrally Planned Economies. Its share of the region's total consumption, however, has fallen from 68% in 1960 to an estimated 63% in 1980 with a further decline to 60% expected by year 2000.

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[1] There is a virtual lack of any hard information on recent consumption and production of forest products in Centrally Planned Asia. Only two recent studies about this sub-region's forest products have been uncovered. Because of its extensive scope, the study by S.D. Richardson, The Production and Consumption of Forest Products in Mainland China - Future Requirements and Trade Prospects, has been of particular value. The other study, however, varies widely from Richardson's report in its estimates of both historical consumption and production. Thus the Working Party has had to form its view of industry trends from a sparse number of documents which have disagreed with each other by significant orders of magnitude. The final historical statistics selected for use in this report are primarily drawn from the FAO data base which lies more or less in the middle of these various estimates.

The Centrally Planned Asia portion of this study, therefore, provides only a rough indication of the magnitude of the sub-region's supply and demand for solidwood production. It should not be considered as a definitive analysis of its consumption and trends. It is further assumed that despite a very low level of consumption compared to other countries in the Far East, the Centrally Planned Asia sub-region will continue to remain basically self-sufficient. Any estimation errors, therefore, should not have a significant effect on world trade patterns.

Sawnwood products are projected to dominate the region's fiber consumption through the turn of the century. Although pulp products should gradually expand their share of total products consumed to 33% by 2000, sawnwood products should at that time still represent about 43% of the fiber in products consumed.

Softwoods predominate in the Centrally Planned Economies. By the year 2000 they are still expected to represent 88% of the Soviet Union's production of fiber products and 63% of those made in Eastern Europe. Although the Working Party has scant information about Centrally Planned Asia, it estimates that softwoods will predominate there as well with their share of products consumed equivalent to 67% in 2000.

8.1 SAWNWOOD AND SLEEPERS

The Centrally Planned Economies are estimated to consume 38% of the world's sawnwood compared to only 27% of the world's wood fibers. Their share of world consumption has been reasonably stable since 1970 after falling sharply from an estimated 42% of world consumption in 1960 to a 38% share in 1970. No further significant share decline is expected during the balance of this century. Softwoods are projected to predominate throughout the forecast period, representing approximately 83% of the region's sawnwood consumed.

8.1.1 EASTERN EUROPE

Eastern Europe's consumption of sawnwood is projected to continue growing in the 1980-2000 period despite a shift in self-sufficiency. Consumption during the latest decade has been rising at an estimated rate of 1.7% which the Working Party estimates will decline to a 1.3% rate between 1980 and 2000. Softwood sawnwood's growth is expected to decline from the recent rate of 1.8% to 1.3% whereas hardwood sawnwood's rate should stabilize at the recent rate of 1.3%. By 2000 sawnwood consumption is expected to reach 30.8 million cbm, up from an estimated 23.8 million cbm in 1980.

In preparing its estimate for sawnwood consumption the Working Party has inspected historical population and income relationships. Per capita consumption has been selected as the base for forecasting purposes. The Working Party has, however, recognized that possible supply constraints on domestic sawlogs could have an impact on Eastern Europe's future consumption. As noted on Table 8.1, sawnwood self-sufficiency is expected to fall below 100% during this decade, reaching 90% by 2000. As the need to import sawnwood rises, it could be that even the modest 1.3% consumption growth level which the Working Party has projected will not be achieved.

8.1.2 U.S.S.R.

Consumption of sawnwood in the Soviet Union is projected to continue growing at approximately the same rate which has prevailed since 1960. By the year 2000 consumption is expected to reach 136.0 million cbm, up from 105.6 million cbm and 117.8 million cbm in 1960 and 1980 respectively. Compared with a growth rate of 0.5% projected for the 1960-80 period, consumption is expected to grow at an 0.7% rate between 1980 and 2000. Softwood sawnwood should continue to gain share relative to hardwood, rising from 84% in 1960 to 88% in 1980 and 89% by 2000.

In making its projection for the Soviet Union's sawnwood consumption, the Working Party relied primarily on an assessment of historical relationships and projected population growth. Sawnwood consumption per capita has on trend been declining. Softwood sawnwood, for example, has dropped from a per capita consumption level of 0.415 cbm in 1960 to 0.400 cbm in 1970 and an estimated 0.386 cbm in 1980. The Working Party has decided, however, not to project a significant lowering of this rate. Among factors maintaining high consumption levels is the building up of infrastructure needed for the economic development of Siberia.

The Soviet Union's self-sufficiency is expected to be in the 106%-108% range for the balance of this century. Although consumption is expected to rise from 118 million cbm to 136 million cbm between 1980 and 2000, production should rise even faster from 125 million cbm to 146 million cbm. The U.S.S.R. is expected to continue producing roughly one third of the world's softwood sawnwood throughout the next two decades. As consumption grows throughout Europe and in Japan, the U.S.S.R.'s exports should further increase from the current level of 8 million cbm to about 10 million cbm in the 1990's.

The outlook for hardwood sawnwood is quite different. Consumption is projected to decline until the early 1980's when the Soviet Union is expected to expand its harvesting of western hardwoods. As this increase occurs, a natural outgrowth should be an increase in sawnwood production. Since the Soviet Union is fundamentally self-sufficient in hardwood sawnwood, domestic consumption is expected to rise along with this increase in supply.

8.1.3 CENTRALLY PLANNED ASIA

The consumption of sawnwood in Centrally Planned Asia is currently estimated in the range of 20 million cbm. This sub-region thus is believed to represent barely 5% of world consumption, despite containing about 21% of the world's population.

By year 2000 this relationship is expected to shift only modestly. Centrally Planned Asia's share of sawnwood consumption is expected to increase to 6% while its share of world population drops to 19%. Softwoods are projected to represent the largest proportion of consumption, rising from an estimated 63% in 1980 to 65% by 2000. As noted in paragraph 8.0, Centrally Planned Asia is expected to remain basically self-sufficient for its wood products requirements throughout the forecast period.

8.2 PANEL PRODUCTS

As in other world regions, consumption of panel products in the Centrally Planned Economies is projected to grow faster than sawnwood consumption. Compared with sawnwood's estimated annual growth of 1.0%, panel products between 1980 and 2000 are projected to grow at a 2.5% rate. This represents, however, a major decline from the 9.6% rate estimated for the 1960-80 period. Reconstituted panels are expected to represent the bulk of consumption, rising from an estimated 45% share in 1960 to 83% by 2000.

The outlook for panels is similar for each of the sub-regions. In Eastern Europe, solid panels are expected to increase by barely a million cbm between 1960 and 2000 while reconstituted panels grow by over 12 million cbm to an 86% share of panels consumed. In the U.S.S.R. reconstituted panels are expected to represent 87% of the region's 7 million cbm in absolute growth of panels during the forecast period. It does seem possible, however, that the Soviet Union's extensive plywood facilities at Bratsk are the harbinger of a successful development effort for larch panels, in which case the reconstituted panel's share is possibly overstated. In Centrally Planned Asia, the split between panels by fiber and product type is quite speculative. Considering the increased utilization of wood from planted forests and the anticipated high residual re-use pattern, the Working Party again has projected a high growth for reconstituted panels with their share of total panels reaching 80% by 2000. The absolute magnitude of panel growth, however, is projected to be much smaller than for Eastern Europe or the Soviet Union.

The region's self-sufficiency for panels is projected to rise gradually as the Soviet Union enters major world plywood markets. Compared with an estimated 3.6 million cbm of plywood consumption, the Soviet Union is projected by year 2000 to be producing 6.2 million cbm. Eastern Europe is expected to import only minor quantities of the U.S.S.R.'s plywood exports with the balance destined primarily for

Europe and Japan. The region's production of reconstituted panels, however, is expected to fall somewhat below its consumption, as Western Europe establishes itself as a minor supplier of Eastern Europe's requirements. The Centrally Planned Asia region is expected to be basically self-sufficient in panel products, although localized trade with markets such as Hong Kong and Japan for specialty panels may occur.

8.3 OTHER INDUSTRIAL PRODUCTS

The Centrally Planned Economies are estimated to consume close to half of the world's other industrial roundwood products. This class of products is an important factor in all three sub-regions, representing of the fiber consumed about 20% in Eastern Europe, 18% in the Soviet Union and 41% in Centrally Planned Asia. Although softwoods predominate in this product category, hardwoods are estimated to represent about 35% of the fiber consumed. There is virtually no interregional trade projected for these products, although the Soviet Union has in the past exported as much as 2 million cbm in one year.

In preparing its outlook for the Centrally Planned Economies the Working Party has departed significantly from the FAO's statistics. It has subtracted 30 million cbm in 1960 and 60 million cbm in 1970 from the reported consumption statistics for the Soviet Union. This adjustment is necessary to correct an apparent overstatement of production which does not match up with the roundwood harvest. For a detailed discussion of this technical problem, readers are referred to pg. 147 of European Timber Trends and Prospects 1950 to 2000, by ECE/FAO.

The adjusted statistics for other industrial products show a declining consumption trend for pitprops and a slightly rising consumption of other industrial roundwood products. The Working Party has projected these trends forward in preparing its consumption estimates for the region. Considering the quality of the historical information base, the outlook developed for this report must be considered particularly speculative. Because products in this category tend to be consumed locally, discrepancies between a region's actual figures and the Working Party's estimates should not materially influence future trends in other product categories.

8.4 WOOD PULP

The Centrally Planned Economies are expected to more than double their consumption of fiber for pulps between 1980 and 2000. Overall growth in this sector, however, is expected to slow to a 3.9% rate, down from the 5.6% annualized rate which is estimated for the 1960-80 period. The region's rising share of world fiber in pulp produced is projected to continue, reaching about 16.8% in year 2000 compared with 10.2% and 13.6% in 1960 and 1980 respectively. Softwoods should continue to predominate in the regional mix, accounting for approximately 85% of pulpwood consumption throughout the forecast period.

8.4.1 EASTERN EUROPE

Eastern Europe's consumption of fiber in wood pulp is projected to continue growing in the 1980-2000 period at a 3.9% rate, down slightly from the 4.4% rate estimated for the 1960-80 period. By year 2000 this sub-region is projected to consume approximately 86 kg of wood pulp per capita. Nonetheless, the region's consumption should still be significantly below that of Western Europe which is estimated at 121 kg per capita in 2000. Chemical pulps are projected to continue exhibiting a strong growth, but high yield pulps should grow even faster; a 4.1% rate is projected for mechanical and semichemical pulps in the 1960-80 period.

The region's consumption of pulpwood, however, is expected to show a striking difference to its consumption of pulp. Eastern Europe's impending fiber scarcity is covered in detail in Phase V. Because of this situation, the Working Party has been forced to choose between a marked reduction in projected pulp consumption or massive pulp imports to offset the fiber scarcity. Selecting the latter as more probable, the Working Party has estimated a rapid decline in the region's self-sufficiency in pulp. Imports of wood pulps are expected to exceed 5 million metric tons by 2000. At that time, Eastern Europe is expected to produce barely half of the fiber in pulp products which it consumes. Thus the growth in consumption of fibers in pulp is expected to decline only from 4.4% to 3.9% during the 1980-2000 periods, but growth of pulpwood consumption by Eastern Europe's mills should decline from 3.9% to 1.2% per annum. Softwoods are expected to continue representing about two thirds of the pulpwood which they consume.

8.4.2 SOVIET UNION

The Soviet Union is projected to more than double its consumption of wood pulps during the 1980-2000 period. By 2000 the U.S.S.R.'s annual consumption is estimated at 22.1 million tons, up from an estimated 10.2 million tons in 1980. Its growth in consumption, however, is expected to taper off somewhat, to a 3.9% annual rate from an estimated 6.4% between 1960 and 1980. Softwood-containing pulps are projected to represent the bulk of the Soviet Union's consumption for pulps throughout the forecast period.

The Soviet Union's production of pulps, however, is expected to rise at a faster rate. Table 8.0.2 in Appendix II shows that to meet the projected import needs of Eastern Europe, the U.S.S.R.'s self-sufficiency will need to reach about 124% by 2000. Exports of fiber in the form of pulp products are expected to exceed 20 million cbm by that time. The Working Party has assessed the Soviet Union's capability to provide the requisite surplus fiber and identified sufficient pulpwood and residuals to meet that need.

8.4.3 CENTRALLY PLANNED ASIA

As noted above the Working Party has scant knowledge about consumption or self-sufficiency trends in Centrally Planned Asia. It estimates that wood pulp consumption in 1980 will be approximately 2.1 million tons, growing to a level of 5.1 million tons by 2000. This equates to a 4.5% annualized growth rate for the 1980-2000 period which is the fastest rate projected outside of the developing world.

Despite the expected preponderance of hardwood stands in China's natural forests, its pulp industry is believed to be based primarily on softwoods. The Working Party has estimated that softwoods should continue to comprise close to 80% of its fiber for producing wood pulps. It has also assumed that self-sufficiency will remain at the level of 100% throughout the forecast period, although there is some possibility that a growing level of net imports will occur.

TABLE 8.0

CENTRALLY PLANNED

OUTLOOK FOR WOOD PRODUCTS

(Millions of Cubic Meters)

	1960		1970		1980		1990		2000	
Softwood	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.
Sawnwood & Sleepers	112.8	117.8	122.7	131.0	134.9	140.6	149.0	157.4	164.4	170.5
Solidwood Panels	1.3	1.3	2.4	2.4	2.9	3.3	3.6	4.5	4.0	5.5
Reconstituted Panels	1.3	1.3	7.6	7.4	15.2	14.7	20.3	19.7	25.2	23.9
Other Ind. Products	45.3	45.0	44.7	46.3	48.2	48.4	48.0	48.2	47.8	48.1
Pulps	20.3	19.7	38.6	37.6	61.0	60.0	86.6	85.2	132.2	129.8
TOTAL SOFTWOOD	181.0	185.1	216.0	224.7	262.2	267.0	307.5	315.0	373.6	377.8
Hardwood										
Sawnwood & Sleepers	25.5	26.0	27.0	27.7	28.2	29.2	31.0	31.9	34.3	35.3
Solidwood Panels	0.9	0.9	1.3	1.7	1.9	2.3	2.4	3.2	2.9	3.8
ReconstitutedmPanels	0.5	0.6	2.5	2.4	4.8	4.5	6.9	6.4	8.6	8.8
Other Ind. Products	18.9	18.9	24.2	24.3	26.2	26.3	25.9	26.0	26.5	26.6
Pulps	3.5	3.5	6.0	6.0	9.5	9.6	16.1	16.0	20.8	20.5
TOTAL HARDWOOD	49.3	49.9	61.0	62.1	70.6	71.9	82.3	83.5	93.1	95.0
Total Softwood & Hardwood										
Sawnwood & Sleepers	138.3	143.8	149.7	158.7	163.1	169.8	180.0	189.3	198.7	205.8
Solidwood Panels	2.2	2.2	3.7	4.1	4.8	5.6	6.0	7.7	6.9	9.3
Reconstituted Panels	1.8	1.9	10.1	9.8	20.0	19.2	27.2	26.1	33.8	32.7
Other Ind. Products	64.2	63.9	68.9	70.6	74.4	74.7	73.9	74.3	74.3	74.7
Pulps	23.8	23.2	44.6	43.6	70.5	69.6	102.7	101.2	153.0	150.3
TOTAL	230.3	235.0	277.0	286.8	332.8	338.9	389.8	398.5	466.7	472.8

TABLE 8.0.1

EASTERN EUROPE

OUTLOOK FOR WOOD PRODUCTS

(Millions of Cubic Meters)

	1960		1970		1980		1990		2000	
	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.
Softwood										
Sawnwood & Sleepers	15.8	15.6	15.1	15.0	18.0	17.0	20.2	18.5	23.3	19.7
Solidwood Panels	0.2	0.2	0.3	0.3	0.4	0.3	0.5	0.4	0.6	0.5
Reconstituted Panels	0.5	0.5	2.6	2.4	5.2	4.6	6.8	6.1	8.6	7.3
Other Ind. Products	6.5	6.1	8.0	7.7	8.0	7.5	7.7	7.3	7.6	7.1
Pulps	6.5	5.9	9.4	8.3	16.3	12.9	23.9	14.5	37.1	15.6
TOTAL SOFTWOOD	29.5	28.3	35.4	33.7	47.9	42.3	59.1	46.8	77.2	50.2
Hardwood										
Sawnwood & Sleepers	3.7	4.2	5.1	5.8	5.8	6.5	7.1	7.1	7.5	8.1
Solidwood Panels	0.6	0.6	0.7	0.8	1.1	1.0	1.3	1.3	1.6	1.5
Reconstituted Panels	0.2	0.3	1.3	1.3	2.9	2.6	3.9	3.4	4.9	5.1
Other Ind. Products	5.1	5.1	5.7	5.8	5.7	5.7	6.2	6.2	6.8	6.8
Pulps	2.6	2.6	3.8	3.8	5.4	5.5	8.0	7.1	9.5	7.7
TOTAL HARDWOOD	12.2	12.8	16.6	17.5	20.9	21.3	26.5	25.1	30.3	29.2
Total Softwood & Hardwood										
Sawnwood & Sleepers	19.5	19.8	20.1	20.8	23.8	23.5	27.3	25.6	30.8	27.8
Solidwood Panels	0.8	0.8	1.1	1.1	1.5	1.3	1.8	1.7	2.2	2.0
Reconstituted Panels	0.7	0.8	3.9	3.7	8.1	7.2	10.7	9.5	13.5	12.4
Other Ind. Products	11.6	11.2	13.7	13.5	13.7	13.2	13.9	13.5	14.4	13.9
Pulps	9.1	8.5	13.2	12.1	21.7	18.4	31.9	21.6	46.6	23.3
TOTAL	41.7	41.1	52.0	51.2	68.8	63.6	85.6	71.9	107.5	79.4

TABLE 8.0.2

U.S.S.R.

OUTLOOK FOR WOOD PRODUCTS
(Millions of Cubic Meters)

	1960		1970		1980		1990		2000	
Softwood	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.
Sawnwood & Sleepers	89.0	94.1	97.2	105.5	103.4	110.2	111.7	122.2	120.5	130.7
Solidwood Panels	1.1	1.1	2.0	2.0	2.3	2.8	2.8	3.8	3.1	4.7
Reconstituted Panels	0.4	0.4	4.3	4.3	9.0	9.1	11.8	11.9	14.1	14.1
Other Ind. Products	30.4	30.5	26.4	28.3	26.9	27.6	26.8	27.4	26.4	27.2
Pulps	11.6	11.6	25.5	25.6	37.8	40.2	52.6	60.6	79.1	98.2
TOTAL SOFTWOOD	132.5	137.7	155.4	165.7	179.4	189.9	205.7	225.9	243.2	274.9
Hardwood										
Sawnwood & Sleepers	16.6	16.6	15.3	15.3	14.4	14.5	14.9	14.9	15.5	15.5
Solidwood Panels	0.1	0.1	0.3	0.6	0.4	0.9	0.5	1.3	0.5	1.5
Reconstituted Panels	0.2	0.2	0.5	0.5	1.1	1.1	1.6	1.6	1.9	1.9
Other Ind. Products	7.7	7.7	10.6	10.6	11.2	11.3	11.3	11.4	11.4	11.5
Pulps	-	-	0.9	0.9	2.5	2.5	5.1	5.9	7.0	8.5
TOTAL HARDWOOD	24.6	24.6	27.6	27.9	29.6	30.3	33.4	35.1	36.3	38.9
Total Softwood & Hardwood										
Sawnwood & Sleepers	105.6	110.7	112.5	120.8	117.8	124.7	126.6	137.1	136.0	146.2
Solidwood Panels	1.2	1.2	2.3	2.6	2.7	3.7	3.3	5.1	3.6	6.2
Reconstituted Panels	0.6	0.6	4.8	4.8	10.1	10.2	13.4	13.5	16.0	16.0
Other Ind. Products	38.1	38.2	37.0	38.9	38.1	38.9	38.1	38.8	37.8	38.7
Pulps	11.6	11.6	26.4	26.5	40.3	42.7	57.7	66.5	86.1	106.7
TOTAL	157.1	162.3	183.0	193.6	209.0	220.2	239.1	261.0	279.5	313.8

TABLE 8.0.3

CENTRALLY PLANNED ASIA

OUTLOOK FOR WOOD PRODUCTS

(Millions of Cubic Meters)

	1960		1970		1980		1990		2000	
	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.
Softwood										
Sawnwood & Sleepers	8.0	8.1	10.4	10.5	13.5	13.4	17.1	16.7	20.6	20.1
Solidwood Panels	-	-	0.1	0.1	0.2	0.2	0.3	0.3	0.3	0.3
Reconstituted Panels	0.4	0.4	0.7	0.7	1.0	1.0	1.7	1.7	2.5	2.5
Other Ind. Products	8.4	8.4	10.3	10.3	13.3	13.3	13.5	13.5	13.8	13.8
Pulps	2.2	2.2	3.7	3.7	6.9	6.9	10.1	10.1	16.0	16.0
TOTAL SOFTWOOD	19.0	19.1	25.2	25.3	34.9	34.8	42.7	42.3	53.2	52.7
Hardwood										
Sawnwood & Sleepers	5.2	5.2	6.6	6.6	8.0	8.2	9.6	9.9	11.3	11.7
Solidwood Panels	0.2	0.2	0.3	0.3	0.4	0.4	0.6	0.6	0.8	0.8
Reconstituted Panels	0.1	0.1	0.6	0.6	0.8	0.8	1.4	1.4	1.8	1.8
Other Ind. Products	6.1	6.1	7.9	7.9	9.3	9.3	8.4	8.4	8.3	8.3
Pulps	0.9	0.9	1.3	1.3	1.6	1.6	3.0	3.0	4.3	4.3
TOTAL HARDWOOD	12.5	12.5	16.7	16.7	20.1	20.3	23.0	23.3	26.5	26.9
Total Softwood & Hardwood										
Sawnwood & Sleepers	13.2	13.3	17.0	17.1	21.5	21.6	26.7	26.6	31.9	31.8
Solidwood Panels	0.2	0.2	0.4	0.4	0.6	0.6	0.9	0.9	1.1	1.1
Reconstituted Panels	0.5	0.5	1.3	1.3	1.8	1.8	3.1	3.1	4.3	4.3
Other Ind. Products	14.5	14.5	18.2	18.2	22.6	22.6	21.9	21.9	22.1	22.1
Pulps	3.1	3.1	5.0	5.0	8.5	8.5	13.1	13.1	20.3	20.3
TOTAL	31.5	31.6	41.9	42.0	55.0	55.1	65.7	65.6	79.7	79.6

APPENDIX I

Working Party Composition and Assignments

Western Hemisphere Team

Member and Affiliation	Geographic Area	Major Responsibilities
Bruce J. McGroarty Duncan Naysmith ABITIBI PAPER CO., LTD.	Eastern Canada	Wood Products Demand Conversion Factors Residual Usage Fiber Supply
Arvid Thorstensen M. F. Painter COUNCIL OF FOREST INDUSTRIES	Western Canada	Wood Products Demand Conversion Factors Residual Usage Fiber Supply
Gordon A. Venne OWENS-ILLINOIS Charles Shih ST. REGIS PAPER CO.	Northern United States	Wood Products Demand Conversion Factors Residual Usage Fiber Supply
James E. Allen ST. REGIS PAPER CO. W. N. Haynes UNION CAMP CORP.	Southern United States	Wood Products Demand Conversion Factors Residual Usage Fiber Supply
Thomas R. Terfehr CHAMPION INTERNATIONAL John E. Wishart GEORGIA PACIFIC	Western United States	Wood Products Demand Conversion Factors Residual Usage Fiber Supply
Paul Areson UNION CAMP CORP.	United States	Wood Products Demand
Dr. James Yoho INTERNATIONAL PAPER CO. Emil Jones FOOD AND AGRICULTURE ORGANIZATION	Latin America	Wood Products Demand Conversion Factors Residual Usage Fiber Supply
Antoinette S. Gabriel CROWN ZELLERBACH CORP.	Western Hemisphere	Regional Working Party Coordinator

Africa, Europe, U.S.S.R.

Member and Affiliation	Geographic Area	Major Responsibilities
Jean P. Lanly FAO, Rome	Africa South of the Sahara	Fiber Supply Coordinator
Felix Palmer NORTH AMERICAN LUMBER SALES LIMITED	Africa, Mid-East, United Kingdom	Wood Products Demand
E. Clicheroux MINISTRY OF AGRICULTURE	Belgium	Wood Supply
V. Grenaa Kristensen ROYAL VETERINARY AND AGRICULTURAL UNIVERSITY	Denmark	Wood Supply
Heinrich Ollmann FEDERAL RESEARCH CENTRE OF FORESTRY AND FOREST PRODUCTS	Federal Republic of Germany	Sawnwood
Karl Oedekoven MINISTRY OF FOOD, AGRICULTURE AND FORESTRY	Federal Republic of Germany	Wood Supply
Hannu Valtanen CENTRAL ASSOCIATION OF FINNISH FOREST INDUSTRIES	Finland	Wood Supply
Paavo Miettinen FINNISH SAWMILL OWNERS' ASSOCIATION	Finland	Sawnwood
Seppo Vainio FINNISH SAWMILL OWNERS' ASSOCIATION	Finland	Sawnwood
K. Kuusela FOREST RESEARCH INSTITUTE	Finland	Wood Supply
Gerard Lemaignen FEDERATION FRANCAISE DES BOIS TROPICAUX	France	Sawnwood

Africa, Europe, U.S.S.R. (cont'd.)

Member and Affiliation	Geographic Area	Major Responsibilities
Guy Degos MINISTRY OF AGRICULTURE	France	Wood Supply
O. Katsanos GENERAL DIRECTORATE OF FORESTS	Greece	Wood Supply
Aladar Halasz MINISTRY OF FOOD AND AGRICULTURE	Hungary	Wood Supply
Guglielmo Giordano GENERAL ITALIAN TIMBER INDUSTRY FEDERATION	Italy	Sawnwood Wood Supply
E. Lammerts van Bueren STATE FOREST SERVICE	Netherlands	Wood Supply
Arne Scheistroen MINISTRY OF AGRICULTURE	Norway	Wood Supply
Halvor Skjelmerud NORWEGIAN INSTITUTE OF WOOD-WORKING TECHNIQUES AND WOOD TECHNOLOGY	Norway	Sawnwood
Tadeusz Trampler FOREST RESEARCH INSTITUTE	Poland	Wood Supply
Jose Caetano Velez MINISTRY OF AGRICULTURE AND FISHERIES	Portugal	Wood Supply
Ruis Teixeira Lopo PORTUCEL	Portugal	Sawnwood
Javier Martinez Millan ICONA	Spain	Wood Supply
Nils-Erik Nilsson NATIONAL BOARD OF FORESTRY	Sweden	Wood Supply

Africa, Europe, U.S.S.R. (cont'd.)

Member and Affiliation	Geographic Area	Major Responsibilities
Lars Strangh SWEDISH WOOD EXPORTERS' ASSOCIATION	Sweden	Sawnwood
S. Uhlin SWEDISH WOOD EXPORTERS' ASSOCIATION	Sweden	Sawnwood
Andrea Semadeni FEDERAL INSPECTORATE OF FORESTRY	Switzerland	Wood Supply
R. D. S. Church ALBERNICONSULT	Turkey	Wood Supply
Gwyn Frances FORESTRY COMMISSION	United Kingdom	Wood Supply
D. Orescanin	Yugoslavia	Wood Supply
W. E. Townsley COUNCIL OF FOREST INDUSTRIES OF BRITISH COLUMBIA	Europe	Plywood & Veneer
A. W. Barghoorn GERMAN WOOD-BASED BOARD ASSOCIATION	Europe	Particleboard
K. Bengtson SWEDISH FIBREBOARD ASSOCIATION AND FEDERATION OF NORDIC FIBREBOARD INDUSTRIES	Europe	Fiberboard
Otto Eckmullner HOCHSCHULE FUR BODENKULTUR	Europe	Regional Working Party Coordinator
T. J. Peck ECE, Geneva	Europe	Fiber Supply Coordinator

Eastern Hemisphere Team		
Member and Affiliation	Geographic Area	Major Responsibilities
Steven Kaufmann SEABORD LUMBER SALES Vancouver, B. C.	Eastern Hemisphere	Coordinator
Dato Chong Peng Wah Forest Dept. Headquarters Malaysia	ASEAN Countries	Coordinator
Lukito Daryadi DIRECTORATE GENERAL FORESTRY, Indonesia	Indonesia	Wood Products Demand & Supply
Simeon A. de Jesus PAPER INDUSTRY CORP. OF THE PHILIPPINES	Philippines	Wood Products Demand & Supply
Narong Pengprecha ROYAL FOREST DEPT. Thailand	Thailand	Wood Products Demand & Supply
Lee Let MALAYSIAN TIMBER INDUSTRY BOARD, Malaysia	Malaysia	Wood Products Demand & Supply
Katsuhiro Kotari JAPAN INTERNATIONAL COOPERATION AGENCY, Japan	Japan	Wood Products Demand & Supply
T. R. Brabin VICTORIA SAWMILLERS ASSOC. Australia	Australia Fiji	Wood Products Demand & Supply
A. K. Familton NEW ZEALAND FOREST SERVICE New Zealand	New Zealand Other Oceania	Wood Products Demand & Supply
Jean P. Lanly FAO Rome, Italy	Far East	Fibre Supply Coordinator

Member and Affiliation	
Stanley L. Pringle FAO Rome, Italy	Coordinator for FAO Cooperation
Theodore D. Frey CROWN ZELLERBACH CORP.	PROJECT LEADER

APPENDIX II

Table 2.0.0.1

WORLD OUTLOOK FOR WOOD PULPS

(Fiber Volume, Millions of Cubic Meters)

	1960		1970		1980		1990		2000	
Softwoods	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.
Mechanical/Semi-Chemical	43.1	43.1	63.8	63.8	76.3	76.3	104.5	104.5	152.9	152.9
Unbleached Kraft	56.2	56.2	101.4	101.4	131.6	131.6	164.8	164.8	217.7	217.7
White Pulp	78.4	78.4	134.0	134.0	157.1	157.1	193.1	193.1	244.5	244.5
Dissolving Pulp	10.0	10.0	14.8	14.8	14.5	14.5	14.9	14.9	15.9	15.9
TOTAL SOFTWOODS	187.6	187.6	314.0	314.0	379.5	379.5	477.3	477.3	631.0	631.0
Hardwoods										
Mechanical/Semi-Chemical	8.7	8.7	20.6	20.6	30.0	30.0	42.3	42.3	59.3	59.3
Unbleached Kraft	0.4	0.4	4.3	4.3	11.2	11.2	21.3	21.3	32.1	32.1
White Pulp	23.5	23.5	55.8	55.8	82.2	82.2	115.4	115.4	163.9	163.9
Dissolving Pulp	7.2	7.2	11.0	11.0	8.6	8.6	8.1	8.1	8.3	8.3
TOTAL HARDWOODS	39.8	39.8	91.7	91.7	132.0	132.0	187.1	187.1	263.6	263.6
Total Pulps										
Mechanical/Semi-Chemical	51.8	51.8	84.4	84.4	106.3	106.3	146.8	146.8	212.2	212.2
Unbleached Kraft	56.6	56.6	105.7	105.7	142.8	142.8	186.1	186.1	249.8	249.8
White Pulp	101.9	101.9	189.8	189.8	239.3	239.3	308.5	308.5	408.4	408.4
Dissolving Pulp	17.2	17.2	25.8	25.8	23.1	23.1	23.0	23.0	24.2	24.2
TOTAL PULPS	227.5	227.5	405.7	405.7	511.5	511.5	664.4	664.4	894.6	894.6

Table 2.0.0.2

WORLD OUTLOOK FOR WOOD PULPS

(Millions of Metric Tons)

	1960		1970		1980		1990		2000	
Softwoods	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.
Mechanical/Semi-Chemical	16.9	16.9	24.8	24.8	30.0	30.0	42.0	42.0	62.1	62.1
Unbleached Kraft	13.8	13.8	24.6	24.6	32.3	32.3	40.8	40.8	53.1	53.1
White Pulp	15.3	15.3	26.0	26.0	31.2	31.2	38.6	38.6	49.3	49.3
Dissolving Pulp	1.9	1.9	2.7	2.7	2.7	2.7	2.8	2.8	3.0	3.0
TOTAL SOFTWOODS	48.0	48.0	78.1	78.1	96.1	96.1	124.1	124.1	167.5	167.5
Hardwoods										
Mechanical/Semi-Chemical	3.6	3.6	9.3	9.3	12.8	12.8	17.8	17.8	24.9	24.9
Unbleached Kraft	0.1	0.1	1.3	1.3	3.3	3.3	6.4	6.4	9.5	9.5
White Pulp	5.6	5.6	13.7	13.7	20.3	20.3	28.5	28.5	40.4	40.4
Dissolving Pulp	1.3	1.3	2.1	2.1	1.7	1.7	1.6	1.6	1.6	1.6
TOTAL HARDWOODS	10.5	10.5	26.4	26.4	38.1	38.1	54.3	54.3	76.4	76.4
Total Pulps										
Mechanical/Semi-Chemical	20.5	20.5	34.1	34.1	42.6	42.6	59.8	59.8	86.9	86.9
Unbleached Kraft	13.9	13.9	25.9	25.9	35.6	35.6	47.1	47.1	62.6	62.6
White Pulp	20.9	20.9	39.7	39.7	51.5	51.5	67.1	67.1	89.8	89.8
Dissolving Pulp	3.2	3.2	4.8	4.8	4.4	4.4	4.4	4.4	4.6	4.6
TOTAL PULPS	58.5	58.5	104.5	104.5	134.1	134.1	178.3	178.3	243.9	243.9

Table 3.0.0.1

NORTH AMERICA OUTLOOK FOR WOOD PULPS

(Fiber Volume, Millions of Cubic Meters)

	1960		1970		1980		1990		2000	
	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.
Softwoods										
Mechanical/Semi-Chemical	21.6	21.7	28.5	28.6	32.2	32.2	41.8	43.3	61.3	63.4
Unbleached Kraft	33.5	33.8	56.9	57.6	66.1	67.0	74.8	75.8	89.7	90.9
White Pulp	44.8	46.4	68.9	81.2	73.6	87.1	80.6	97.2	82.3	106.7
Dissolving Pulp	4.4	5.8	5.1	7.9	3.5	5.6	3.5	4.9	3.6	4.9
TOTAL SOFTWOODS	104.3	107.7	159.4	175.3	175.4	191.9	200.7	221.2	236.9	265.9
Hardwoods										
Mechanical/Semi-Chemical	6.9	6.9	11.7	11.7	15.5	15.5	21.1	21.1	28.8	28.8
Unbleached Kraft	-	-	1.3	1.3	5.8	5.8	12.5	12.5	18.7	18.7
White Pulp	9.1	9.9	21.2	24.6	31.7	36.5	41.0	46.5	58.1	64.3
Dissolving Pulp	1.3	1.7	2.0	2.5	1.5	1.7	1.5	1.4	1.5	1.4
TOTAL HARDWOODS	17.3	18.5	36.2	40.1	54.5	59.5	76.1	81.5	107.1	113.2
Total Pulps										
Mechanical/Semi-Chemical	28.5	28.6	40.2	40.3	47.7	47.7	62.9	64.4	90.1	92.2
Unbleached Kraft	33.5	33.8	58.2	58.9	71.9	72.8	87.3	88.3	108.4	109.6
White Pulp	53.9	56.3	90.1	105.8	105.3	123.6	121.6	143.7	140.4	171.0
Dissolving Pulp	5.7	7.5	7.1	10.4	5.0	7.3	5.0	6.3	5.1	6.3
TOTAL PULPS	121.6	126.2	195.6	215.4	229.9	251.4	276.8	302.7	344.0	379.1

Table 3.0.0.2

NORTH AMERICA OUTLOOK FOR WOOD PULPS

(Millions of Metric Tons)

	1960		1970		1980		1990		2000	
Softwoods	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.
Mechanical/Semi-Chemical	8.7	8.7	11.4	11.4	12.9	12.9	17.7	18.2	26.8	27.5
Unbleached Kraft	8.8	8.9	15.0	15.3	17.8	18.0	20.2	20.5	23.7	24.0
White Pulp	8.8	9.1	13.4	15.8	14.7	17.4	16.1	19.4	16.7	21.4
Dissolving Pulp	0.8	1.1	0.9	1.4	0.6	1.0	0.6	0.9	0.7	0.9
TOTAL SOFTWOODS	27.1	27.8	40.7	43.9	46.1	49.3	54.6	59.0	67.8	73.7
Hardwoods										
Mechanical/Semi-Chemical	2.9	2.8	5.4	5.4	6.6	6.6	9.0	9.0	12.2	12.1
Unbleached Kraft	-	-	0.4	0.4	1.8	1.8	3.8	3.8	5.6	5.6
White Pulp	2.2	2.3	5.1	5.8	7.6	8.6	9.9	11.1	14.0	15.5
Dissolving Pulp	0.2	0.4	0.3	0.5	0.3	0.4	0.3	0.3	0.3	0.3
TOTAL HARDWOODS	5.3	5.5	11.2	12.1	16.3	17.3	23.0	24.2	32.2	33.5
Total Pulps										
Mechanical/Semi-Chemical	11.6	11.5	16.8	16.8	19.5	19.5	26.7	27.2	39.0	39.6
Unbleached Kraft	8.8	8.9	15.3	15.7	19.6	19.8	24.0	24.3	29.2	29.6
White Pulp	11.0	11.4	18.5	21.6	22.3	25.9	26.0	30.5	30.7	36.9
Dissolving Pulp	1.1	1.5	1.2	1.9	0.9	1.4	0.9	1.2	1.0	1.2
TOTAL PULPS	32.4	33.3	51.8	56.0	62.3	66.7	77.6	83.1	100.0	107.2

Table 3.0.1.1

CANADA OUTLOOK FOR WOOD PULPS

(Fiber Volume, Millions of Cubic Meters)

	1960		1970		1980		1990		2000	
Softwoods	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.
Mechanical/Semi-Chemical	14.1	14.6	18.6	19.1	18.6	19.5	21.7	23.5	25.3	27.4
Unbleached Kraft	3.5	4.3	4.9	6.4	7.6	8.5	9.0	9.8	10.3	11.4
White Pulp	9.9	17.9	16.2	37.7	16.1	40.7	15.6	47.0	16.5	58.8
Dissolving Pulp	0.4	1.7	0.4	1.8	0.4	0.8	0.4	0.7	0.4	0.7
TOTAL SOFTWOODS	27.9	38.5	40.1	65.0	42.7	69.5	46.7	81.0	52.5	98.3
Hardwoods										
Mechanical/Semi-Chemical	0.4	0.4	0.9	0.9	1.8	1.8	2.0	2.0	2.5	2.5
Unbleached Kraft	-	-	0.1	0.1	0.1	0.1	0.4	0.4	0.9	0.9
White Pulp	0.6	0.8	1.0	2.9	2.4	4.9	3.1	5.6	3.9	5.7
Dissolving Pulp	0.1	0.4	0.1	0.5	0.1	0.3	0.1	0.2	0.1	0.2
TOTAL HARDWOODS	1.1	1.6	2.1	4.4	4.4	7.1	5.6	8.2	7.4	9.3
Total Pulps										
Mechanical/Semi-Chemical	14.5	15.0	19.5	20.0	20.4	21.3	23.7	25.5	27.8	29.9
Unbleached Kraft	3.4	4.3	5.0	6.5	7.7	8.6	9.4	10.2	11.2	12.3
White Pulp	10.5	18.7	17.2	40.6	18.5	45.6	18.7	52.6	20.4	64.5
Dissolving Pulp	0.5	2.1	0.5	2.3	0.5	1.1	0.5	0.9	0.5	0.9
TOTAL PULPS	28.9	40.1	42.2	69.4	47.1	76.6	52.3	89.2	59.9	107.6

Table 3.0.1.2

CANADA OUTLOOK FOR WOOD PULPS

(Millions of Metric Tons)

	1960		1970		1980		1990		2000	
Softwoods	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.
Mechanical/Semi-Chemical	5.3	5.5	7.0	7.2	7.0	7.4	8.2	8.9	9.6	10.3
Unbleached Kraft	0.6	0.9	1.0	1.3	1.6	1.8	1.9	2.1	2.2	2.4
White Pulp	1.8	3.2	2.9	6.9	2.9	7.7	2.8	8.9	3.0	11.4
Dissolving Pulp	0.1	0.3	0.1	0.3	0.1	0.1	0.1	0.1	0.1	0.1
TOTAL SOFTWOODS	7.8	9.9	11.0	15.7	11.6	17.0	13.0	20.0	14.9	24.2
Hardwoods										
Mechanical/Semi-Chemical	0.1	0.1	0.3	0.3	0.6	0.6	0.7	0.7	0.8	0.8
Unbleached Kraft	-	-	-	-	-	-	0.1	0.1	0.2	0.2
White Pulp	0.1	0.2	0.2	0.5	0.4	0.9	0.6	1.0	0.7	1.1
Dissolving Pulp	-	0.1	-	0.1	-	0.1	-	-	-	-
TOTAL HARDWOODS	0.2	0.4	0.5	0.9	1.0	1.6	1.4	1.8	1.7	2.1
Total Pulps										
Mechanical/Semi-Chemical	5.4	5.6	7.3	7.5	7.7	8.0	8.9	9.6	10.4	11.1
Unbleached Kraft	0.6	0.9	1.0	1.3	1.6	1.8	2.0	2.2	2.4	2.6
White Pulp	1.9	3.4	3.1	7.4	3.4	8.6	3.4	9.9	3.7	12.5
Dissolving Pulp	0.1	0.4	0.1	0.4	0.1	0.2	0.1	0.1	0.1	0.1
TOTAL PULPS	8.0	10.3	11.5	11.6	12.5	18.6	14.4	21.7	16.6	26.3

Table 3.0.2.1

UNITED STATES OUTLOOK FOR WOOD PULPS

(Fiber Volume, Millions of Cubic Meters)

	1960		1970		1980		1990		2000	
Softwoods	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.
Mechanical/Semi-Chemical	7.5	7.1	9.9	9.5	13.6	12.7	20.1	19.8	36.0	36.0
Unbleached Kraft	30.0	29.5	52.0	51.2	58.5	58.5	65.8	66.0	79.4	79.5
White Pulp	34.9	28.5	52.7	43.5	57.5	46.4	65.0	50.2	65.8	47.9
Dissolving Pulp	4.0	4.1	4.7	6.1	3.1	4.8	3.1	4.2	3.2	4.2
TOTAL SOFTWOODS	76.4	69.2	119.3	110.3	132.7	122.4	154.0	140.2	184.4	167.6
Hardwoods										
Mechanical/Semi-Chemical	6.5	6.5	10.8	10.8	13.7	13.7	19.1	19.1	26.3	26.3
Unbleached Kraft	-	-	1.2	1.2	5.7	5.7	12.1	12.1	17.8	17.8
White Pulp	8.5	9.1	20.2	21.7	29.3	31.6	37.9	40.9	54.2	58.6
Dissolving Pulp	1.2	1.3	1.9	2.0	1.4	1.4	1.4	1.2	1.4	1.2
TOTAL HARDWOODS	16.2	16.9	34.1	35.7	50.1	52.4	70.5	73.3	99.7	103.9
Total Pulps										
Mechanical/Semi-Chemical	14.0	13.6	20.7	20.3	27.3	26.4	39.2	38.9	62.3	62.3
Unbleached Kraft	30.0	29.5	53.2	52.4	64.2	64.2	77.9	78.1	97.2	97.3
White Pulp	43.4	37.6	72.9	65.2	86.8	78.0	102.9	91.1	120.0	106.5
Dissolving Pulp	5.2	5.4	6.6	8.1	4.5	6.2	4.5	5.4	4.6	5.4
TOTAL PULPS	92.6	86.1	153.4	146.0	182.8	174.8	224.5	213.5	284.1	271.5

Table 3.0.2.2

UNITED STATES OUTLOOK FOR WOOD PULPS

(Millions of Metric Tons)

	1960		1970		1980		1990		2000	
Softwoods	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.
Mechanical/Semi-Chemical	3.4	3.2	4.4	4.2	5.8	5.5	9.5	9.3	17.2	17.2
Unbleached Kraft	8.1	8.0	14.0	14.0	16.2	16.2	18.4	18.5	21.5	21.6
White Pulp	7.0	5.9	10.5	8.9	11.8	9.7	13.3	10.5	13.7	10.0
Dissolving Pulp	0.7	0.8	0.8	1.1	0.6	0.9	0.6	0.8	0.6	0.8
TOTAL SOFTWOODS	19.3	17.9	29.7	28.2	34.4	32.3	41.7	39.0	53.0	49.6
Hardwoods										
Mechanical/Semi-Chemical	2.8	2.7	5.1	5.1	6.0	6.0	8.3	8.3	11.3	11.3
Unbleached Kraft	-	-	0.3	0.3	1.8	1.8	3.7	3.7	5.4	5.4
White Pulp	2.1	2.1	4.9	5.3	7.2	7.7	9.3	10.1	13.3	14.4
Dissolving Pulp	0.2	0.3	0.3	0.4	0.3	0.3	0.3	0.3	0.3	0.3
TOTAL HARDWOODS	5.1	5.1	10.6	11.2	15.3	15.8	21.6	22.4	30.3	31.4
Total Pulps										
Mechanical/Semi-Chemical	6.2	5.9	9.5	9.3	11.8	11.5	17.8	17.6	28.5	28.5
Unbleached Kraft	8.1	8.0	14.3	14.4	18.0	18.0	22.1	22.2	26.9	27.0
White Pulp	9.1	8.0	15.4	14.2	19.0	17.4	22.6	20.6	27.0	24.4
Dissolving Pulp	1.0	1.1	1.1	1.5	0.9	1.2	0.9	1.1	0.9	1.1
TOTAL PULPS	24.4	23.0	40.3	39.4	49.7	48.1	63.4	61.4	83.3	81.0

Table 4.0.0.1

WESTERN EUROPE OUTLOOK FOR WOOD PULPS

(Fiber Volume, Millions of Cubic Meters)

	1960		1970		1980		1990		2000	
	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.
Softwoods										
Mechanical/Semi-Chemical	13.8	13.8	22.0	21.9	24.9	25.2	32.7	31.1	42.4	40.4
Unbleached Kraft	14.5	14.4	21.3	22.4	26.6	26.8	31.3	31.0	35.6	35.9
White Pulp	17.6	18.4	39.0	32.8	45.6	38.2	51.9	43.7	63.2	48.3
Dissolving Pulp	2.7	2.8	3.5	2.8	2.3	2.2	2.1	2.3	2.0	2.3
TOTAL SOFTWOODS	48.6	49.4	85.8	79.9	99.4	92.4	118.0	108.1	143.2	126.9
Hardwoods										
Mechanical/Semi-Chemical	0.6	0.6	3.3	3.3	5.3	5.3	6.5	6.5	8.1	8.1
Unbleached Kraft	-	-	0.1	0.1	0.2	0.2	1.0	1.0	1.5	1.5
White Pulp	7.2	6.8	17.3	15.1	24.9	20.4	34.6	25.2	44.4	33.8
Dissolving Pulp	4.2	4.0	5.0	4.2	3.7	3.1	3.4	3.2	3.6	3.2
TOTAL HARDWOODS	12.0	11.4	25.7	22.7	34.1	29.0	45.5	35.9	57.6	46.6
Total Pulps										
Mechanical/Semi-Chemical	14.4	14.4	25.3	25.2	30.2	30.5	39.2	37.6	50.5	48.5
Unbleached Kraft	14.5	14.4	21.4	22.5	26.8	27.0	32.3	32.0	37.1	37.4
White Pulp	24.8	25.2	56.3	47.9	70.5	58.6	86.5	68.9	107.6	82.1
Dissolving Pulp	6.9	6.8	8.5	7.0	6.0	5.3	5.5	5.5	5.6	5.5
TOTAL PULPS	60.6	60.8	111.5	102.6	133.5	121.4	163.5	144.0	200.8	173.5

Table 4.0.0.2

WESTERN EUROPE OUTLOOK FOR WOOD PULPS

(Millions of Metric Tons)

	1960		1970		1980		1990		2000	
Softwoods	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.
Mechanical/Semi-Chemical	5.2	5.2	8.3	8.3	9.6	9.8	12.4	12.0	15.9	15.2
Unbleached Kraft	2.9	2.9	4.5	4.5	5.5	5.5	6.5	6.4	7.6	7.6
White Pulp	3.4	3.4	7.4	6.2	9.0	7.4	10.3	8.7	12.4	9.7
Dissolving Pulp	0.6	0.6	0.7	0.7	0.4	0.4	0.4	0.4	0.3	0.4
TOTAL SOFTWOODS	12.1	12.1	21.0	19.7	24.5	23.1	29.6	27.6	36.3	33.0
Hardwoods										
Mechanical/Semi-Chemical	0.2	0.2	1.3	1.3	2.0	2.0	2.7	2.6	3.2	3.2
Unbleached Kraft	-	-	-	-	-	-	0.3	0.3	0.4	0.4
White Pulp	1.7	1.7	4.1	3.6	5.7	4.9	8.0	6.1	10.4	8.3
Dissolving Pulp	0.7	0.6	1.0	0.7	0.7	0.6	0.6	0.6	0.7	0.6
TOTAL HARDWOODS	2.6	2.5	6.4	5.6	8.4	7.5	11.6	9.6	14.7	12.5
Total Pulps										
Mechanical/Semi-Chemical	5.4	5.4	9.7	9.6	11.6	11.8	15.0	14.6	19.1	18.4
Unbleached Kraft	2.9	2.9	4.5	4.5	5.5	5.5	6.8	6.7	8.1	8.0
White Pulp	5.1	5.1	11.5	9.8	14.6	12.4	18.2	14.8	22.8	18.0
Dissolving Pulp	1.3	1.2	1.7	1.4	1.1	1.0	1.0	1.1	1.0	1.0
TOTAL PULPS	14.7	14.6	27.4	25.3	32.9	30.6	41.1	37.2	51.0	45.6

Table 4.0.1.1

FRANCE OUTLOOK FOR WOOD PULPS

(Fiber Volume, Millions of Cubic Meters)

	1960		1970		1980		1990		2000	
	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.
Softwoods										
Mechanical/Semi-Chemical	1.3	1.1	1.5	1.2	1.6	1.4	2.0	1.7	2.5	2.4
Unbleached Kraft	1.9	0.8	2.3	1.7	3.4	2.3	4.0	3.4	4.5	4.5
White Pulp	2.1	0.6	4.3	1.2	5.3	1.9	5.9	2.2	6.8	2.5
Dissolving Pulp	0.6	0.2	0.5	0.3	0.3	0.2	0.3	0.2	0.4	0.2
TOTAL SOFTWOODS	5.9	2.7	8.6	4.4	10.6	5.8	12.2	7.5	14.2	9.6
Hardwoods										
Mechanical/Semi-Chemical	0.2	0.2	0.6	0.5	1.0	0.9	1.4	1.3	1.9	1.8
Unbleached Kraft	-	-	-	-	-	-	-	-	-	-
White Pulp	1.6	0.8	2.2	1.8	3.7	2.4	4.4	2.6	5.2	2.8
Dissolving Pulp	0.5	0.2	0.3	0.3	0.3	0.2	0.3	0.2	0.3	0.2
TOTAL HARDWOODS	2.3	1.2	3.1	2.6	5.0	3.5	6.1	4.1	7.4	4.8
Total Pulps										
Mechanical/Semi-Chemical	1.5	1.3	2.1	1.7	2.6	2.3	3.4	3.0	4.4	4.2
Unbleached Kraft	1.9	0.8	2.3	1.7	3.4	2.3	4.0	3.4	4.5	4.5
White Pulp	3.7	1.4	6.5	3.0	9.0	4.3	10.3	4.8	12.0	5.3
Dissolving Pulp	1.1	0.4	0.8	0.6	0.6	0.4	0.6	0.4	0.7	0.4
TOTAL PULPS	8.2	3.9	11.6	7.0	15.6	9.3	18.3	11.6	21.6	14.4

Table 4.0.1.2

FRANCE OUTLOOK FOR WOOD PULPS

(Millions of Metric Tons)

	1960		1970		1980		1990		2000	
Softwoods	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.
Mechanical/Semi-Chemical	0.5	0.4	0.6	0.5	0.6	0.6	0.8	0.7	1.0	1.0
Unbleached Kraft	0.4	0.2	0.5	0.4	0.8	0.5	0.9	0.8	1.0	1.0
White Pulp	0.4	0.1	0.8	0.2	1.1	0.4	1.2	0.4	1.4	0.5
Dissolving Pulp	0.1	-	0.1	0.1	0.1	-	0.1	-	0.1	-
TOTAL SOFTWOODS	1.4	0.7	2.0	1.2	2.5	1.5	3.0	1.9	3.5	2.5
Hardwoods										
Mechanical/Semi-Chemical	0.1	0.1	0.2	0.2	0.4	0.3	0.5	0.5	0.7	0.7
Unbleached Kraft	-	-	-	-	-	-	-	-	-	-
White Pulp	0.4	0.2	0.5	0.4	0.8	0.6	1.0	0.6	1.2	0.7
Dissolving Pulp	0.1	-	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
TOTAL HARDWOODS	0.6	0.3	0.8	0.7	1.3	1.0	1.6	1.2	2.0	1.5
Total Pulps										
Mechanical/Semi-Chemical	0.6	0.5	0.8	0.7	1.0	0.9	1.3	1.2	1.7	1.7
Unbleached Kraft	0.4	0.2	0.5	0.4	0.8	0.5	0.9	0.8	1.0	1.0
White Pulp	0.8	0.3	1.3	0.6	1.9	1.0	2.2	1.0	2.6	1.2
Dissolving Pulp	0.2	0.0	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1
TOTAL PULPS	2.0	1.0	2.8	1.9	3.8	2.5	4.6	3.1	5.4	4.0

Table 4.0.2.1

WEST GERMANY OUTLOOK FOR WOOD PULPS

(Fiber Volume, Millions of Cubic Meters)

	1960		1970		1980		1990		2000	
Softwoods	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.
Mechanical/Semi-Chemical	1.9	1.8	2.9	2.7	4.0	4.0	5.3	5.2	6.1	6.0
Unbleached Kraft	1.0	-	0.9	-	0.9	-	1.3	-	1.8	-
White Pulp	4.0	1.9	6.4	1.8	8.0	2.0	10.0	2.6	12.0	2.8
Dissolving Pulp	0.8	0.5	0.7	0.3	0.5	0.3	0.4	0.4	0.4	0.4
TOTAL SOFTWOODS	7.7	4.2	10.9	4.8	13.4	6.3	17.1	8.2	20.3	9.2
Hardwoods										
Mechanical/Semi-Chemical	-	-	-	-	0.2	0.2	0.2	0.2	0.2	0.2
Unbleached Kraft	-	-	-	-	-	-	-	-	-	-
White Pulp	1.3	0.4	2.4	0.6	4.0	0.6	5.4	1.0	7.4	1.4
Dissolving Pulp	1.0	0.7	1.2	0.7	0.7	0.5	0.6	0.6	0.7	0.6
TOTAL HARDWOODS	2.3	1.1	3.6	1.3	4.9	1.3	6.2	1.8	8.3	2.2
Total Pulps										
Mechanical/Semi-Chemical	1.9	1.8	2.9	2.7	4.2	4.2	5.5	5.4	6.3	6.2
Unbleached Kraft	1.0	-	0.9	-	0.9	-	1.3	-	1.8	-
White Pulp	5.3	2.3	8.8	2.4	12.0	2.6	15.4	3.6	19.4	4.2
Dissolving Pulp	1.8	1.2	1.9	1.0	1.2	0.8	1.0	1.0	1.1	1.0
TOTAL PULPS	10.0	5.3	14.4	6.1	18.3	7.6	23.3	10.0	28.6	11.4

Table 4.0.2.2

WEST GERMANY OUTLOOK FOR WOOD PULPS

(Millions of Metric Tons)

	1960		1970		1980		1990		2000	
Softwoods	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.
Mechanical/Semi-Chemical	0.6	0.6	1.0	0.9	1.4	1.3	1.8	1.7	2.0	2.0
Unbleached Kraft	0.2	-	0.2	-	0.2	-	0.3	-	0.4	-
White Pulp	0.8	0.4	1.2	0.4	1.6	0.4	2.0	0.6	2.4	0.6
Dissolving Pulp	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
TOTAL SOFTWOODS	1.7	1.1	2.5	1.4	3.2	1.8	4.2	2.4	4.9	2.7
Hardwoods										
Mechanical/Semi-Chemical	-	-	-	-	0.1	0.1	0.1	0.1	0.1	0.1
Unbleached Kraft	-	-	-	-	-	-	-	-	-	-
White Pulp	0.3	0.1	0.5	0.1	0.9	0.1	1.2	0.2	1.6	0.3
Dissolving Pulp	0.2	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1
TOTAL HARDWOODS	0.5	0.2	0.7	0.2	1.1	0.3	1.4	0.4	1.8	0.5
Total Pulps										
Mechanical/Semi-Chemical	0.6	0.6	1.0	0.9	1.5	1.4	1.8	1.8	2.1	2.1
Unbleached Kraft	0.2	-	0.2	-	0.2	-	0.3	-	0.4	-
White Pulp	1.1	0.5	1.7	0.5	2.5	0.5	3.1	0.8	4.0	0.9
Dissolving Pulp	0.3	0.2	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2
TOTAL PULPS	2.2	1.3	3.2	1.6	4.3	2.1	5.5	2.8	6.7	3.2

Table 4.0.3.1.

UNITED KINGDOM OUTLOOK FOR WOOD PULPS

(Fiber Volume, Millions of Cubic Meters)

	1960		1970		1980		1990		2000	
Softwoods	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.
Mechanical/Semi-Chemical	2.5	0.7	2.0	0.7	1.5	0.5	1.9	0.5	2.3	1.1
Unbleached Kraft	2.5	-	0.9	-	1.0	-	1.1	-	1.2	1.0
White Pulp	2.1	0.1	5.1	0.2	5.4	0.2	5.5	0.2	5.7	0.8
Dissolving Pulp	0.2	-	0.5	-	0.3	-	0.3	-	0.3	-
TOTAL SOFTWOODS	7.3	0.8	8.5	0.9	8.2	0.7	8.9	0.7	9.5	2.9
Hardwoods										
Mechanical/Semi-Chemical	-	-	0.2	0.1	0.3	0.3	0.3	0.3	0.3	0.3
Unbleached Kraft	-	-	-	-	-	-	-	-	-	-
White Pulp	1.0	0.1	2.7	0.2	3.5	0.1	4.5	0.1	4.6	0.1
Dissolving Pulp	1.4	-	1.6	-	1.2	-	1.0	-	1.1	-
TOTAL HARDWOODS	2.4	0.1	4.5	0.3	5.0	0.4	5.8	0.4	6.0	0.4
Total Pulps										
Mechanical/Semi-Chemical	2.5	0.7	2.2	0.8	1.8	0.8	2.2	0.8	2.6	1.4
Unbleached Kraft	2.5	-	0.9	-	1.0	-	1.1	-	1.2	1.0
White Pulp	3.1	0.2	7.8	0.4	8.9	0.3	10.0	0.3	10.3	0.9
Dissolving Pulp	1.6	-	2.1	-	1.5	-	1.3	-	1.4	-
TOTAL PULPS	9.7	0.9	13.0	1.2	13.2	1.1	14.7	1.1	15.5	3.3

Table 4.0.3.2.

UNITED KINGDOM OUTLOOK FOR WOOD PULPS

(Millions of Metric Tons)

	1960		1970		1980		1990		2000	
	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.
Softwoods										
Mechanical/Semi-Chemical	1.0	0.2	0.8	0.2	0.5	0.2	0.6	0.2	0.8	0.4
Unbleached Kraft	0.5	-	0.2	-	0.2	-	0.2	-	0.3	0.3
White Pulp	0.4	-	1.0	-	1.1	-	1.1	-	1.1	0.2
Dissolving Pulp	-	-	0.1	-	0.1	-	0.1	-	-	-
TOTAL SOFTWOODS	1.9	0.2	2.1	0.2	1.9	0.2	2.0	0.2	2.3	0.9
Hardwoods										
Mechanical/Semi-Chemical	-	-	0.1	-	0.1	0.1	0.1	0.1	0.1	0.1
Unbleached Kraft	-	-	-	-	-	-	-	-	-	-
White Pulp	0.2	-	0.6	-	0.8	-	1.0	-	1.0	-
Dissolving Pulp	0.3	-	0.3	-	0.2	-	0.2	-	0.2	-
TOTAL HARDWOODS	0.5	-	1.0	-	1.1	0.1	1.4	0.1	1.4	0.1
Total Pulps										
Mechanical/Semi-Chemical	1.0	0.2	0.9	0.2	0.6	0.3	0.8	0.3	1.0	0.5
Unbleached Kraft	0.5	-	0.2	-	0.2	-	0.2	-	0.3	0.3
White Pulp	0.6	-	1.6	-	1.8	-	2.0	-	2.1	0.2
Dissolving Pulp	0.3	-	0.4	-	0.3	-	0.2	-	0.2	-
TOTAL PULPS	2.4	0.2	3.1	0.2	3.0	0.3	3.3	0.3	3.7	1.0

Table 4.0.4.1

OTHER EEC OUTLOOK FOR WOOD PULPS

(Fiber Volume, Millions of Cubic Meters)

	1960		1970		1980		1990		2000	
Softwoods	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.
Mechanical/Semi-Chemical	1.9	1.5	3.2	2.4	3.1	2.6	4.3	3.5	5.3	4.2
Unbleached Kraft	1.0	0.1	1.3	0.2	1.8	0.2	2.3	0.2	2.8	0.2
White Pulp	3.3	0.2	6.7	0.4	8.0	0.7	9.5	0.7	12.5	0.7
Dissolving Pulp	0.5	0.2	0.7	0.2	0.3	0.2	0.2	0.2	0.2	0.2
TOTAL SOFTWOODS	6.7	2.0	11.9	3.2	13.2	3.7	16.3	4.6	20.8	5.3
Hardwoods										
Mechanical/Semi-Chemical	0.2	0.2	0.8	0.9	1.1	1.1	1.4	1.4	1.8	1.8
Unbleached Kraft	-	-	-	-	-	-	-	-	-	-
White Pulp	1.4	0.4	2.7	0.6	3.4	1.1	6.3	1.5	9.0	2.1
Dissolving Pulp	0.5	0.2	0.9	0.2	0.5	0.2	0.5	0.2	0.5	0.2
TOTAL HARDWOODS	2.1	0.8	4.4	1.7	5.1	2.4	8.2	3.1	11.3	4.1
Total Pulps										
Mechanical/Semi-Chemical	2.1	1.7	4.0	3.3	4.3	3.7	5.7	4.9	7.1	6.0
Unbleached Kraft	1.0	0.1	1.3	0.2	1.8	0.2	2.3	0.2	2.8	0.2
White Pulp	4.7	0.6	9.4	1.0	11.4	1.8	15.8	2.2	21.5	2.8
Dissolving Pulp	1.0	0.4	1.6	0.4	0.8	0.4	0.7	0.4	0.7	0.4
TOTAL PULPS	8.8	2.8	16.3	4.9	18.3	6.1	24.5	7.7	32.1	9.4

Table 4.0.4.2

OTHER EEC OUTLOOK FOR WOOD PULPS

(Millions of Metric Tons)

	1960		1970		1980		1990		2000	
Softwoods	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.
Mechanical/Semi-Chemical	0.6	0.5	1.1	0.8	1.2	0.9	1.4	1.2	1.8	1.4
Unbleached Kraft	0.2	-	0.3	-	0.4	-	0.5	0.1	0.7	0.1
White Pulp	0.7	-	1.3	0.1	1.6	0.2	1.9	0.2	2.5	0.2
Dissolving Pulp	0.1	0.1	0.2	0.1	0.1	-	0.1	-	0.1	-
TOTAL SOFTWOODS	1.6	0.6	2.9	1.0	3.3	1.2	3.9	1.5	5.0	1.8
Hardwoods										
Mechanical/Semi-Chemical	0.1	0.1	0.3	0.3	0.4	0.4	0.5	0.5	0.6	0.6
Unbleached Kraft	-	-	-	-	-	-	-	-	-	-
White Pulp	0.3	0.1	0.6	0.1	0.7	0.2	1.3	0.3	1.9	0.4
Dissolving Pulp	0.1	-	0.2	-	0.1	-	0.1	-	0.1	-
TOTAL HARDWOODS	0.5	0.2	1.1	0.4	1.2	0.6	1.9	0.8	2.6	1.0
Total Pulps										
Mechanical/Semi-Chemical	0.7	0.6	1.4	1.1	1.6	1.3	1.9	1.7	2.4	2.0
Unbleached Kraft	0.2	-	0.3	-	0.4	-	0.5	0.1	0.7	0.1
White Pulp	1.0	0.1	1.9	0.2	2.4	0.4	3.3	0.5	4.4	0.6
Dissolving Pulp	0.2	0.1	0.4	0.1	0.2	0.1	0.1	0.1	0.1	0.1
TOTAL PULPS	2.1	0.8	4.0	1.4	4.5	1.8	5.9	2.4	7.6	2.8

Table 4.0.5.1

NORDIC COUNTRIES OUTLOOK FOR WOOD PULPS

(Fiber Volume, Millions of Cubic Meters)

	1960		1970		1980		1990		2000	
Softwoods	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.
Mechanical/Semi-Chemical	5.2	7.7	10.4	13.0	11.7	13.7	15.1	16.1	20.5	21.0
Unbleached Kraft	7.1	12.6	13.5	18.2	15.8	20.3	17.0	21.4	18.2	21.8
White Pulp	4.5	14.0	12.4	26.1	13.2	29.8	13.7	32.9	15.1	35.0
Dissolving Pulp	0.2	1.6	0.2	1.5	0.3	1.0	0.3	1.0	0.2	1.0
TOTAL SOFTWOODS	17.0	35.9	36.5	58.8	41.0	64.8	46.1	71.4	54.0	78.8
Hardwoods										
Mechanical/Semi-Chemical	0.1	0.1	1.6	1.7	2.1	2.2	2.5	2.5	2.8	2.9
Unbleached Kraft	-	-	-	-	-	-	0.7	0.7	1.0	1.0
White Pulp	1.3	4.5	3.7	8.2	4.3	9.7	5.8	10.1	8.5	11.7
Dissolving Pulp	0.3	2.5	0.4	2.3	0.4	1.5	0.4	1.5	0.4	1.5
TOTAL HARDWOODS	1.7	7.1	5.6	12.2	6.8	13.4	9.4	14.8	12.7	17.1
Total Pulps										
Mechanical/Semi-Chemical	5.3	7/8	12.0	14.7	13.8	15.9	17.6	18.6	23.3	23.9
Unbleached Kraft	7.1	12.6	13.6	18.2	15.8	20.3	17.7	22.1	19.2	22.8
White Pulp	5.8	18.5	16.0	34.3	17.5	39.5	19.5	43.0	23.6	46.7
Dissolving Pulp	0.5	4.1	0.6	3.8	0.7	2.5	0.7	2.5	0.6	2.5
TOTAL PULPS	18.7	43.0	42.2	71.0	47.8	78.2	55.5	86.2	66.7	95.9

Table 4.0.5.2

NORDIC COUNTRIES OUTLOOK FOR WOOD PULPS

(Millions of Metric Tons)

	1960		1970		1980		1990		2000	
	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.
Softwoods										
Mechanical/Semi-Chemical	2.1	3.1	4.2	5.2	4.9	5.7	6.3	6.7	8.2	8.4
Unbleached Kraft	1.4	2.5	2.7	3.6	3.2	4.1	3.5	4.4	3.8	4.5
White Pulp	0.8	2.6	2.3	4.9	2.5	5.7	2.7	6.5	3.0	7.0
Dissolving Pulp	-	0.3	-	0.3	-	0.2	-	0.2	-	0.2
TOTAL SOFTWOODS	4.3	8.5	9.2	14.0	10.6	15.7	12.4	17.8	15.0	20.1
Hardwoods										
Mechanical/Semi-Chemical	-	-	0.6	0.7	0.9	0.9	1.1	1.1	1.3	1.3
Unbleached Kraft	-	-	-	-	-	-	0.2	0.2	0.3	0.3
White Pulp	0.3	1.1	1.0	2.1	1.1	2.5	1.6	2.7	2.4	3.2
Dissolving Pulp	0.1	0.4	0.1	0.4	0.1	0.3	0.1	0.3	0.1	0.3
TOTAL HARDWOODS	0.4	1.5	1.7	3.2	2.1	3.7	3.0	4.3	4.1	5.1
Total Pulps										
Mechanical/Semi-Chemical	2.1	3.1	4.8	5.9	5.7	6.6	7.4	7.8	9.5	9.7
Unbleached Kraft	1.4	2.5	2.7	3.6	3.2	4.1	3.7	4.6	4.1	4.8
White Pulp	1.1	3.7	3.3	7.0	3.6	8.2	4.4	9.2	5.4	10.2
Dissolving Pulp	0.1	0.7	0.1	0.7	0.1	0.5	0.1	0.5	0.1	0.5
TOTAL PULPS	4.7	10.0	10.9	17.2	12.7	19.4	15.5	22.1	19.1	25.2

Table 4.0.6.1

OTHER WESTERN EUROPE OUTLOOK FOR WOOD PULPS

(Fiber Volume, Millions of Cubic Meters)

	1960		1970		1980		1990		2000	
Softwoods	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.
Mechanical/Semi-Chemical	1.0	1.0	2.0	1.9	3.0	3.0	4.1	4.1	5.7	5.7
Unbleached Kraft	1.0	0.9	2.4	2.3	3.7	4.0	5.4	6.0	7.1	8.4
White Pulp	1.6	1.6	4.2	3.1	5.7	3.6	7.3	5.1	11.1	6.5
Dissolving Pulp	0.4	0.3	0.9	0.5	0.6	0.5	0.6	0.5	0.5	0.5
TOTAL SOFTWOODS	4.0	3.8	9.5	7.8	13.0	11.1	17.4	15.7	24.4	21.1
Hardwoods										
Mechanical/Semi-Chemical	0.1	0.1	0.2	0.1	0.6	0.6	0.8	0.8	1.1	1.1
Unbleached Kraft	-	-	0.1	0.1	0.2	0.2	0.3	0.3	0.5	0.5
White Pulp	0.6	0.6	3.7	3.7	6.0	6.5	8.2	9.9	9.7	15.7
Dissolving Pulp	0.5	0.4	0.6	0.7	0.6	0.7	0.6	0.7	0.6	0.7
TOTAL HARDWOODS	1.2	1.1	4.6	4.6	7.4	8.0	9.9	11.7	11.9	18.0
Total Pulps										
Mechanical/Semi-Chemical	1.1	1.1	2.2	2.0	3.6	3.6	4.9	4.9	6.8	6.8
Unbleached Kraft	1.0	0.9	2.5	2.4	3.9	4.2	5.7	6.3	7.6	8.9
White Pulp	2.2	2.2	7.9	6.8	11.7	10.1	15.5	15.0	20.8	22.2
Dissolving Pulp	0.9	0.7	1.5	1.2	1.2	1.2	1.2	1.2	1.1	1.2
TOTAL PULPS	5.2	4.9	14.1	12.4	20.4	19.1	27.3	27.4	36.3	39.1

Table 4.0.6.2

OTHER WESTERN EUROPE OUTLOOK FOR WOOD PULPS

(Millions of Metric Tons)

	1960		1970		1980		1990		2000	
Softwoods	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.
Mechanical/Semi-Chemical	0.4	0.4	0.7	0.7	1.1	1.1	1.5	1.5	2.0	2.0
Unbleached Kraft	0.2	0.2	0.6	0.5	0.8	0.8	1.1	1.3	1.5	1.8
White Pulp	0.3	0.3	0.8	0.6	1.1	0.7	1.4	1.0	2.1	1.2
Dissolving Pulp	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1
TOTAL SOFTWOODS	1.0	1.0	2.3	1.9	3.0	2.7	4.1	3.9	5.7	5.1
Hardwoods										
Mechanical/Semi-Chemical	-	-	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4
Unbleached Kraft	-	-	-	-	-	-	0.1	0.1	0.1	0.1
White Pulp	0.2	0.2	0.9	0.9	1.4	1.5	1.9	2.3	2.3	3.7
Dissolving Pulp	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
TOTAL HARDWOODS	0.3	0.3	1.1	1.1	1.7	1.8	2.4	2.8	2.9	4.3
Total Pulps										
Mechanical/Semi-Chemical	0.4	0.4	0.8	0.8	1.3	1.3	1.8	1.8	2.4	2.4
Unbleached Kraft	0.2	0.2	0.6	0.5	0.8	0.8	1.2	1.4	1.6	1.9
White Pulp	0.5	0.5	1.7	1.5	2.5	2.2	3.3	3.3	4.4	4.9
Dissolving Pulp	0.2	0.2	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2
TOTAL PULPS	1.3	1.3	3.4	3.0	4.7	4.5	6.5	6.7	8.6	9.4

Table 5.0.0.1

JAPAN OUTLOOK FOR WOOD PULPS

(Fiber Volume, Millions of Cubic Meters)

	1960		1970		1980		1990		2000	
Softwoods	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.
Mechanical/Semi-Chemical	2.1	2.1	2.9	2.9	4.6	4.6	7.1	7.1	11.2	11.2
Unbleached Kraft	2.4	2.4	6.8	6.4	11.5	11.0	17.0	16.6	26.0	25.2
White Pulp	2.3	2.3	4.8	2.5	5.7	3.9	9.7	4.4	14.6	4.4
Dissolving Pulp	1.7	0.9	1.2	0.2	0.5	-	0.4	-	0.3	-
TOTAL SOFTWOODS	8.5	7.7	15.7	12.0	22.3	19.5	34.2	28.1	52.1	40.8
Hardwoods										
Mechanical/Semi-Chemical	0.8	0.8	4.1	4.1	4.3	4.3	5.9	5.9	7.8	7.8
Unbleached Kraft	0.4	0.4	2.0	2.0	2.4	2.4	3.2	3.2	4.3	4.3
White Pulp	2.4	2.4	8.6	8.1	13.6	11.5	19.7	14.8	29.3	17.1
Dissolving Pulp	1.1	0.9	2.7	2.0	1.2	0.9	0.7	0.5	0.5	0.4
TOTAL HARDWOODS	4.7	4.5	17.4	16.2	21.5	19.1	29.5	24.4	41.9	29.6
Total Pulps										
Mechanical/Semi-Chemical	2.9	2.9	7.0	7.0	8.9	8.9	13.0	13.0	19.0	19.0
Unbleached Kraft	2.8	2.8	8.8	8.4	13.9	13.4	20.2	19.8	30.3	29.5
White Pulp	4.7	4.7	13.4	10.6	19.3	15.4	29.4	19.2	43.9	21.5
Dissolving Pulp	2.8	1.8	3.9	2.2	1.7	0.9	1.1	0.5	0.8	0.4
TOTAL PULPS	13.2	12.2	33.1	28.2	43.8	38.6	63.7	52.5	94.0	70.4

Table 5.0.0.2

JAPAN OUTLOOK FOR WOOD PULPS

(Millions of Metric Tons)

	1960		1970		1980		1990		2000	
Softwoods	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.
Mechanical/Semi-Chemical	0.9	0.9	1.3	1.3	2.0	2.0	3.2	3.2	5.0	5.0
Unbleached Kraft	0.6	0.6	1.4	1.3	2.5	2.4	3.9	3.7	5.7	5.5
White Pulp	0.6	0.6	1.0	0.6	1.2	0.8	2.0	1.0	3.2	1.0
Dissolving Pulp	0.3	0.2	0.2	-	0.1	-	0.1	-	0.1	-
TOTAL SOFTWOODS	2.4	2.3	3.9	3.2	5.8	5.2	9.1	7.9	14.0	11.5
Hardwoods										
Mechanical/Semi-Chemical	0.3	0.3	1.9	1.9	2.0	2.0	2.7	2.7	3.6	3.6
Unbleached Kraft	0.1	0.1	0.6	0.6	0.8	0.8	1.0	1.0	1.4	1.4
White Pulp	0.6	0.6	2.6	2.5	4.0	3.4	5.8	4.4	8.4	5.0
Dissolving Pulp	0.2	0.2	0.6	0.5	0.3	0.2	0.2	0.1	0.1	0.1
TOTAL HARDWOODS	1.2	1.2	5.7	5.5	7.1	6.4	9.7	8.2	13.5	10.1
Total Pulps										
Mechanical/Semi-Chemical	1.2	1.2	3.2	3.2	4.0	4.0	5.9	5.9	8.6	8.6
Unbleached Kraft	0.7	0.7	2.0	1.9	3.3	3.2	4.9	4.7	7.0	6.9
White Pulp	1.2	1.2	3.6	3.1	5.3	4.2	7.8	5.3	11.6	6.0
Dissolving Pulp	0.5	0.4	0.8	0.5	0.4	0.2	0.3	0.1	0.2	0.1
TOTAL PULPS	3.5	3.5	9.6	8.7	13.0	11.6	18.8	16.1	27.4	21.6

Table 6.0.0.1

LATIN AMERICA OUTLOOK FOR WOOD PULPS

(Fiber Volume, Millions of Cubic Meters)

	1960		1970		1980		1990		2000	
Softwoods	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.
Mechanical/Semi-Chemical	0.5	0.4	0.8	0.8	0.9	0.8	2.1	2.2	5.8	5.8
Unbleached Kraft	0.5	0.4	2.2	1.8	3.6	3.6	6.5	6.5	11.6	11.6
White Pulp	2.0	0.6	3.2	1.7	4.1	3.0	8.3	9.9	15.9	19.0
Dissolving Pulp	-	-	0.5	-	0.5	0.4	0.5	0.4	0.5	0.4
TOTAL SOFTWOODS	3.0	1.4	6.7	4.3	9.1	7.8	17.4	19.0	33.8	36.8
Hardwoods										
Mechanical/Semi-Chemical	0.2	0.2	0.5	0.5	1.4	1.4	2.7	2.7	4.8	4.8
Unbleached Kraft	-	-	0.3	0.3	0.7	0.7	0.9	0.8	1.0	1.0
White Pulp	1.3	1.1	3.4	3.2	3.8	5.7	6.0	9.6	10.3	11.4
Dissolving Pulp	-	-	-	-	0.2	-	0.3	-	0.3	-
TOTAL HARDWOODS	1.5	1.3	4.2	4.0	6.1	7.8	9.9	13.1	16.4	17.2
Total Pulps										
Mechanical/Semi-Chemical	0.7	0.6	1.3	1.3	2.3	2.2	4.8	4.9	10.6	10.6
Unbleached Kraft	0.5	0.4	2.5	2.1	4.3	4.3	7.4	7.3	12.6	12.6
White Pulp	3.3	1.7	6.6	4.9	7.9	8.7	14.3	19.5	26.2	30.4
Dissolving Pulp	-	-	0.5	-	0.7	0.4	0.8	0.4	0.8	0.4
TOTAL PULPS	4.5	2.7	10.9	8.3	15.2	15.6	27.3	32.1	50.2	54.0

Table 6.0.0.2

LATIN AMERICA OUTLOOK FOR WOOD PULPS

(Millions of Metric Tons)

	1960		1970		1980		1990		2000	
Softwoods	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.
Mechanical/Semi-Chemical	0.2	0.2	0.3	0.3	0.4	0.3	0.9	0.9	2.4	2.4
Unbleached Kraft	0.1	0.1	0.5	0.4	0.9	0.9	1.6	1.6	2.8	2.8
White Pulp	0.3	0.1	0.6	0.3	0.8	0.6	1.6	1.9	3.2	3.8
Dissolving Pulp	-	-	0.1	-	0.1	0.1	0.1	0.1	0.1	0.1
TOTAL SOFTWOODS	0.7	0.4	1.5	1.0	2.2	1.9	4.2	4.5	8.5	9.0
Hardwoods										
Mechanical/Semi-Chemical	0.1	0.1	0.2	0.2	0.6	0.6	1.2	1.2	2.1	2.1
Unbleached Kraft	-	-	0.1	0.1	0.2	0.2	0.3	0.2	0.3	0.3
White Pulp	0.3	0.3	0.9	0.8	1.0	1.4	1.5	2.5	2.6	2.9
Dissolving Pulp	-	-	-	-	-	-	-	-	0.1	-
TOTAL HARDWOODS	0.4	0.4	1.2	1.1	1.8	2.2	3.0	3.9	5.1	5.3
Total Pulps										
Mechanical/Semi-Chemical	0.3	0.3	0.5	0.5	1.0	0.9	2.1	2.1	4.5	4.5
Unbleached Kraft	0.1	0.1	0.6	0.5	1.1	1.1	1.8	1.8	3.1	3.1
White Pulp	0.7	0.4	1.5	1.1	1.8	2.0	3.2	4.4	5.8	6.7
Dissolving Pulp	-	-	0.1	-	0.1	0.1	0.1	0.1	0.2	0.1
TOTAL PULPS	1.1	0.8	2.7	2.1	4.0	4.1	7.2	8.4	13.6	14.3

Table 7.0.0.1

OTHER EASTERN HEMISPHERE OUTLOOK FOR WOOD PULPS

(Fiber Volume, Millions of Cubic Meters)

	1960		1970		1980		1990		2000	
Softwoods	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.
Mechanical/Semi-Chemical	0.7	0.7	1.7	1.7	2.4	2.1	3.8	3.8	6.2	6.2
Unbleached Kraft	0.6	0.6	2.6	2.1	4.3	3.7	6.8	6.6	11.7	11.7
White Pulp	1.6	0.5	3.2	1.1	5.0	2.1	9.3	5.3	14.2	12.9
Dissolving Pulp	-	-	0.3	-	0.6	-	0.6	-	0.6	-
TOTAL SOFTWOODS	2.9	1.8	7.9	4.9	12.3	7.9	20.5	15.7	32.8	30.8
Hardwoods										
Mechanical/Semi-Chemical	0.2	0.2	0.3	0.3	1.3	1.2	2.7	2.7	4.9	4.9
Unbleached Kraft	-	-	0.5	0.5	1.9	1.9	3.3	3.3	5.9	5.8
White Pulp	0.6	0.4	1.2	0.7	2.3	2.3	3.4	8.6	8.2	24.0
Dissolving Pulp	-	-	0.2	1.2	0.7	1.6	0.7	1.6	0.8	1.8
TOTAL HARDWOODS	0.8	0.6	2.2	2.7	6.2	7.0	10.1	16.2	19.8	36.5
Total Pulps										
Mechanical/Semi-Chemical	0.9	0.9	2.0	2.0	3.7	3.3	6.5	6.5	11.1	11.1
Unbleached Kraft	0.6	0.6	3.1	2.6	6.2	5.6	10.1	9.9	17.5	17.5
White Pulp	2.2	0.9	4.4	1.8	7.3	4.4	12.7	13.9	22.4	36.9
Dissolving Pulp	-	-	0.5	1.2	1.3	1.6	1.3	1.6	1.5	1.8
TOTAL PULPS	3.7	2.4	10.1	7.6	18.5	14.9	30.6	31.9	52.5	67.3

Table 7.0.0.2

OTHER EASTERN HEMISPHERE OUTLOOK FOR WOOD PULPS

(Millions of Metric Tons)

	1960		1970		1980		1990		2000	
Softwoods	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.
Mechanical/Semi-Chemical	0.3	0.3	0.5	0.6	1.0	0.9	1.6	1.6	2.7	2.7
Unbleached Kraft	0.3	0.2	0.6	0.5	1.1	0.9	1.7	1.7	2.9	2.9
White Pulp	0.2	0.1	0.6	0.2	0.9	0.3	1.8	1.0	2.7	2.5
Dissolving Pulp	-	-	-	-	0.1	-	0.1	-	0.1	-
TOTAL SOFTWOODS	0.7	0.6	1.7	1.3	3.1	2.1	5.2	4.3	8.4	8.0
Hardwoods										
Mechanical/Semi-Chemical	0.1	0.1	0.2	0.2	0.7	0.7	1.0	1.0	1.9	1.9
Unbleached Kraft	-	-	0.2	0.2	0.5	0.5	0.9	0.9	1.6	1.6
White Pulp	0.1	0.1	0.2	0.1	0.5	0.5	0.9	2.0	1.9	5.5
Dissolving Pulp	-	-	-	0.2	0.1	0.3	0.1	0.3	0.1	0.3
TOTAL HARDWOODS	0.2	0.2	0.6	0.7	1.8	2.0	2.9	4.2	5.5	9.3
Total Pulps										
Mechanical/Semi-Chemical	0.4	0.4	0.7	0.8	1.6	1.6	2.7	2.6	4.6	4.6
Unbleached Kraft	0.2	0.2	0.8	0.7	1.4	1.4	2.6	2.5	4.6	4.5
White Pulp	0.4	0.2	0.8	0.3	1.5	0.9	2.6	2.9	4.6	8.0
Dissolving Pulp	-	-	-	0.2	0.2	0.3	0.2	0.3	0.2	0.3
TOTAL PULPS	1.0	0.8	2.3	2.0	4.8	4.1	8.1	8.4	13.9	17.3

Table 7.0.1.1

OCEANIA OUTLOOK FOR WOOD PULPS

(Fiber Volume, Millions of Cubic Meters)

	1960		1970		1980		1990		2000	
Softwoods	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.
Mechanical/Semi-Chemical	0.6	0.6	1.0	1.0	1.0	1.0	1.8	1.8	3.2	3.2
Unbleached Kraft	0.6	0.6	1.2	1.1	2.3	2.3	4.2	4.2	7.7	7.7
White Pulp	0.8	0.2	1.1	0.4	1.7	1.2	2.5	2.3	3.4	6.2
Dissolving Pulp	-	-	-	-	-	-	-	-	-	-
TOTAL SOFTWOODS	2.0	1.4	3.3	2.5	5.0	4.5	8.5	8.3	14.3	17.1
Hardwoods										
Mechanical/Semi-Chemical	0.1	0.1	0.2	0.2	0.3	0.3	0.5	0.5	0.7	0.7
Unbleached Kraft	-	-	-	-	-	-	0.1	0.1	0.3	0.3
White Pulp	0.4	0.3	0.6	0.4	0.8	0.5	1.2	1.7	2.2	4.0
Dissolving Pulp	-	-	-	-	-	-	-	-	-	-
TOTAL HARDWOODS	0.5	0.4	0.8	0.6	1.1	0.8	1.8	2.3	3.2	5.0
Total Pulps										
Mechanical/Semi-Chemical	0.7	0.7	1.2	1.2	1.3	1.3	2.3	2.3	3.9	3.9
Unbleached Kraft	0.6	0.6	1.2	1.1	2.3	2.3	4.3	4.3	8.0	8.0
White Pulp	1.2	0.5	1.7	0.8	2.5	1.7	3.7	4.0	5.6	10.2
Dissolving Pulp	-	-	-	-	-	-	-	-	-	-
TOTAL PULPS	2.5	1.8	4.1	3.1	6.1	5.3	10.3	10.6	17.5	22.1

Table 7.0.1.2

OCEANIA OUTLOOK FOR WOOD PULPS

(Millions of Metric Tons)

	1960		1970		1980		1990		2000	
Softwoods	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.
Mechanical/Semi-Chemical	0.3	0.3	0.4	0.4	0.4	0.4	0.8	0.8	1.5	1.5
Unbleached Kraft	0.2	0.2	0.3	0.3	0.6	0.6	1.1	1.1	2.0	2.0
White Pulp	0.1	-	0.2	0.1	0.3	0.2	0.5	0.4	0.7	1.2
Dissolving Pulp	-	-	-	-	-	-	-	-	-	-
TOTAL SOFTWOODS	0.6	0.5	0.9	0.8	1.3	1.2	2.4	2.3	4.2	4.7
Hardwoods										
Mechanical/Semi-Chemical	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.4	0.4
Unbleached Kraft	-	-	-	-	-	-	-	-	0.1	0.1
White Pulp	0.1	0.1	0.1	0.1	0.2	0.1	0.3	0.4	0.6	1.0
Dissolving Pulp	-	-	-	-	-	-	-	-	-	-
TOTAL HARDWOODS	0.2	0.2	0.2	0.2	0.4	0.3	0.5	0.6	1.1	1.5
Total Pulps										
Mechanical/Semi-Chemical	0.4	0.4	0.5	0.5	0.6	0.6	1.0	1.0	1.9	1.9
Unbleached Kraft	0.2	0.2	0.3	0.3	0.6	0.6	1.1	1.1	2.1	2.1
White Pulp	0.2	0.1	0.3	0.2	0.5	0.3	0.8	0.8	1.3	2.2
Dissolving Pulp	-	-	-	-	-	-	-	-	-	-
TOTAL PULPS	0.8	0.7	1.1	1.0	1.7	1.5	2.9	2.9	5.3	6.2

Table 7.0.2.1

MIDDLE EAST & NORTH AFRICA OUTLOOK FOR WOOD PULPS

(Fiber Volume, Millions of Cubic Meters)

	1960		1970		1980		1990		2000	
	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.
Softwoods										
Mechanical/Semi-Chemical	-	-	0.1	-	-	-	-	-	-	-
Unbleached Kraft	-	-	-	-	0.2	-	0.3	-	0.4	-
White Pulp	0.1	-	0.2	-	0.4	-	1.3	-	2.6	0.8
Dissolving Pulp	-	-	0.1	-	0.1	-	0.1	-	0.1	-
TOTAL SOFTWOODS	0.1	-	0.4	-	0.7	-	1.8	-	3.2	0.8
Hardwoods										
Mechanical/Semi-Chemical	-	-	-	-	0.2	-	0.4	0.4	0.9	0.9
Unbleached Kraft	-	-	-	-	0.4	0.4	0.7	0.7	1.2	1.2
White Pulp	0.1	0.1	0.2	0.2	0.1	0.4	0.2	1.1	1.5	2.8
Dissolving Pulp	-	-	-	-	-	-	-	-	-	-
TOTAL HARDWOODS	0.1	0.1	0.2	0.2	0.7	0.8	1.3	2.2	3.6	4.9
Total Pulps										
Mechanical/Semi-Chemical	-	-	0.1	-	0.2	-	0.4	0.4	0.9	0.9
Unbleached Kraft	-	-	-	-	0.6	0.4	1.1	0.7	1.6	1.2
White Pulp	0.2	0.1	0.4	0.2	0.5	0.4	1.5	1.1	4.1	3.6
Dissolving Pulp	-	-	0.1	-	0.1	-	0.1	-	0.1	-
TOTAL PULPS	0.2	0.1	0.6	0.2	1.4	0.8	3.1	2.2	6.7	5.7

Table 7.0.2.2

MIDDLE EAST & NORTH AFRICA OUTLOOK FOR WOOD PULPS

(Millions of Metric Tons)

	1960		1970		1980		1990		2000	
Softwoods	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.
Mechanical/Semi-Chemical	-	-	-	-	-	-	-	-	-	-
Unbleached Kraft	-	-	-	-	-	-	0.1	-	0.1	-
White Pulp	-	-	-	-	0.1	-	0.3	-	0.5	0.2
Dissolving Pulp	-	-	-	-	-	-	-	-	-	-
TOTAL SOFTWOODS	-	-	-	-	0.1	-	0.4	-	0.6	0.2
Hardwoods										
Mechanical/Semi-Chemical	-	-	-	-	0.1	0.1	0.1	0.1	0.3	0.3
Unbleached Kraft	-	-	-	-	0.1	0.1	0.2	0.2	0.3	0.3
White Pulp	-	-	-	-	-	0.1	-	0.3	0.3	0.6
Dissolving Pulp	-	-	-	-	-	-	-	-	-	-
TOTAL HARDWOODS	-	-	-	-	0.2	0.3	0.3	0.6	0.9	1.2
Total Pulps										
Mechanical/Semi-Chemical	-	-	-	-	0.1	0.1	0.1	0.1	0.3	0.3
Unbleached Kraft	-	-	-	-	0.1	0.1	0.3	0.2	0.4	0.3
White Pulp	-	-	-	-	0.1	0.1	0.3	0.3	0.8	0.8
Dissolving Pulp	-	-	-	-	-	-	-	-	-	-
TOTAL PULPS	-	-	-	-	0.3	0.3	0.7	0.6	1.5	1.4

Table 7.0.3.1

AFRICA SOUTH OF THE SAHARA OUTLOOK FOR WOOD PULPS

(Fiber Volume, Millions of Cubic Meters)

	1960		1970		1980		1990		2000	
	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.
Softwoods										
Mechanical/Semi-Chemical	-	-	0.4	0.4	0.6	0.6	1.0	1.0	1.5	1.5
Unbleached Kraft	-	-	0.6	1.0	0.7	1.4	1.1	1.7	1.8	2.2
White Pulp	0.4	0.3	1.0	0.7	1.1	0.7	1.8	2.2	2.7	3.2
Dissolving Pulp	-	-	-	-	-	-	-	-	-	-
TOTAL SOFTWOODS	0.4	0.3	2.0	2.1	2.4	2.7	3.9	4.9	6.0	6.9
Hardwoods										
Mechanical/Semi-Chemical	-	-	-	-	0.5	0.5	0.6	0.6	0.7	0.7
Unbleached Kraft	-	-	0.3	0.3	0.4	0.4	0.4	0.4	0.5	0.5
White Pulp	-	-	0.1	-	0.3	0.3	0.7	2.6	1.4	7.4
Dissolving Pulp	-	-	0.1	1.1	0.1	1.1	0.1	1.1	0.1	1.2
TOTAL HARDWOODS	-	-	0.5	1.4	1.3	2.3	1.8	4.7	2.7	9.8
Total Pulps										
Mechanical/Semi-Chemical	-	-	0.4	0.4	1.1	1.1	1.6	1.6	2.2	2.2
Unbleached Kraft	-	-	0.9	1.3	1.1	1.8	1.5	2.1	2.3	2.7
White Pulp	0.4	0.3	1.1	0.7	1.4	1.0	2.5	4.8	4.1	10.6
Dissolving Pulp	-	-	0.1	1.1	0.1	1.1	0.1	1.1	0.1	1.2
TOTAL PULPS	0.4	0.3	2.5	3.5	3.7	5.0	5.7	9.6	8.7	16.7

Table 7.0.3.2

AFRICA SOUTH OF THE SAHARA OUTLOOK FOR WOOD PULPS

(Millions of Metric Tons)

	1960		1970		1980		1990		2000	
	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.
Softwoods										
Mechanical/Semi-Chemical	-	-	0.1	0.1	0.3	0.3	0.4	0.4	0.6	0.6
Unbleached Kraft	-	-	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.5
White Pulp	0.1	0.1	0.2	0.1	0.2	0.1	0.3	0.4	0.5	0.6
Dissolving Pulp	-	-	-	-	-	-	-	-	-	-
TOTAL SOFTWOODS	0.1	0.1	0.4	0.4	0.7	0.7	0.1	1.2	1.5	1.7
Hardwoods										
Mechanical/Semi-Chemical	-	-	-	-	0.2	0.2	0.2	0.2	0.2	0.2
Unbleached Kraft	-	-	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2
White Pulp	-	-	-	-	0.1	0.1	0.2	0.6	0.3	1.7
Dissolving Pulp	-	-	-	0.2	-	0.2	-	0.2	-	0.2
TOTAL HARDWOODS	-	-	0.1	0.3	0.4	0.6	0.5	1.1	0.7	2.3
Total Pulps										
Mechanical/Semi-Chemical	-	-	0.1	0.1	0.4	0.5	0.6	0.6	0.8	0.8
Unbleached Kraft	-	-	0.2	0.3	0.3	0.4	0.4	0.5	0.6	0.7
White Pulp	0.1	0.1	0.2	0.1	0.3	0.2	0.5	1.0	0.8	2.3
Dissolving Pulp	-	-	-	0.2	-	0.2	-	0.2	-	0.2
TOTAL PULPS	0.1	0.1	0.5	0.7	1.1	1.3	1.5	2.3	2.2	4.0

Table 7.0.4.1

FAR EAST OUTLOOK FOR WOOD PULPS

(Fiber Volume, Millions of Cubic Meters)

	1960		1970		1980		1990		2000	
Softwoods	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.
Mechanical/Semi-Chemical	0.1	0.1	0.3	0.3	0.8	0.5	1.0	1.0	1.5	1.5
Unbleached Kraft	0.1	-	0.8	-	1.1	-	1.1	0.7	1.8	1.8
White Pulp	0.3	-	0.9	-	1.8	0.2	3.7	0.8	5.5	2.7
Dissolving Pulp	-	-	0.2	-	0.5	-	0.5	-	0.6	-
TOTAL SOFTWOODS	0.5	0.1	2.3	0.3	4.2	0.7	6.3	2.5	9.4	6.0
Hardwoods										
Mechanical/Semi-Chemical	0.1	0.1	0.1	0.1	0.4	0.4	1.2	1.2	2.6	2.6
Unbleached Kraft	-	-	0.2	0.2	1.1	1.1	2.1	2.1	3.8	3.8
White Pulp	0.1	-	0.3	0.1	1.0	1.1	1.3	3.2	3.1	9.8
Dissolving Pulp	-	-	0.1	0.1	0.6	0.5	0.6	0.5	0.7	0.6
TOTAL HARDWOODS	0.2	0.1	0.7	0.5	3.1	3.1	5.2	7.0	10.2	16.8
Total Pulps										
Mechanical/Semi-Chemical	0.2	0.2	0.5	0.4	1.2	0.9	2.2	2.2	4.1	4.1
Unbleached Kraft	0.1	-	1.0	0.2	2.2	1.1	3.2	2.8	5.6	5.6
White Pulp	0.4	-	1.2	0.1	2.8	1.3	5.0	4.0	8.6	12.5
Dissolving Pulp	-	-	0.3	0.1	1.1	0.5	1.1	0.5	1.3	0.6
TOTAL PULPS	0.7	0.2	3.0	0.8	7.3	3.8	11.5	9.5	19.6	22.8

Table 7.0.4.2

FAR EAST OUTLOOK FOR WOOD PULPS

(Millions of Metric Tons)

	1960		1970		1980		1990		2000	
Softwoods	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.
Mechanical/Semi-Chemical	-	-	0.1	0.1	0.3	0.2	0.4	0.4	0.6	0.6
Unbleached Kraft	-	-	0.1	-	0.2	-	0.3	0.2	0.4	0.4
White Pulp	0.1	-	0.2	-	0.3	-	0.7	0.2	1.0	0.5
Dissolving Pulp	-	-	-	-	0.1	-	0.1	-	0.1	-
TOTAL SOFTWOODS	0.1	-	0.4	0.1	0.9	0.2	1.5	0.8	2.1	1.5
Hardwoods										
Mechanical/Semi-Chemical	-	-	0.1	0.1	0.2	0.2	0.5	0.5	1.0	1.0
Unbleached Kraft	-	-	0.1	0.1	0.3	0.3	0.6	0.6	1.0	1.0
White Pulp	-	-	0.1	-	0.2	0.2	0.4	0.7	0.7	2.2
Dissolving Pulp	-	-	-	-	0.1	0.1	0.1	0.1	0.1	0.1
TOTAL HARDWOODS	-	-	0.3	0.2	0.8	0.8	1.6	1.9	2.8	4.3
Total Pulps										
Mechanical/Semi-Chemical	-	-	0.2	0.2	0.5	0.4	0.9	0.9	1.6	1.6
Unbleached Kraft	-	-	0.2	0.1	0.4	0.3	0.8	0.7	1.4	1.4
White Pulp	0.1	-	0.3	-	0.6	0.2	1.0	0.9	1.7	2.7
Dissolving Pulp	-	-	-	-	0.2	0.1	0.2	0.1	0.2	0.1
TOTAL PULPS	0.1	-	0.7	0.3	1.6	1.0	3.0	2.7	4.9	5.8

Table 8.0.0.1

CENTRALLY PLANNED ECONOMIES OUTLOOK FOR WOOD PULPS

(Fiber Volume, Millions of Cubic Meters)

	1960		1970		1980		1990		2000	
	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.
Softwoods										
Mechanical/Semi-Chemical	4.4	4.4	7.9	7.9	11.4	11.4	17.0	17.0	25.9	25.9
Unbleached Kraft	4.6	4.6	11.6	11.1	19.5	19.5	28.5	28.5	43.1	42.4
White Pulp	10.2	10.2	14.9	14.7	23.1	22.8	33.2	32.6	54.3	53.2
Dissolving Pulp	1.1	0.5	4.2	3.9	7.0	6.3	7.9	7.3	8.9	8.3
TOTAL SOFTWOODS	20.3	19.7	38.6	37.6	61.0	60.0	86.6	85.2	132.2	129.8
Hardwoods										
Mechanical/Semi-Chemical	-	-	0.7	0.7	2.2	2.3	3.4	3.4	4.9	4.9
Unbleached Kraft	-	-	0.1	0.1	0.2	0.2	0.5	0.5	0.8	0.8
White Pulp	2.9	2.9	4.1	4.1	5.8	5.8	10.8	10.7	13.6	13.3
Dissolving Pulp	0.6	0.6	1.1	1.1	1.3	1.3	1.4	1.4	1.5	1.5
TOTAL HARDWOODS	3.5	3.5	6.0	6.0	9.5	9.6	16.1	16.0	20.8	20.5
Total Pulps										
Mechanical/Semi-Chemical	4.4	4.4	8.6	8.6	13.6	13.7	20.4	20.4	30.8	30.8
Unbleached Kraft	4.6	4.6	11.7	11.2	19.7	19.7	29.0	28.8	43.9	43.2
White Pulp	13.1	13.1	19.0	18.8	28.9	28.6	44.0	43.3	67.9	66.5
Dissolving Pulp	1.7	1.1	5.3	5.0	8.3	7.6	9.3	8.7	10.4	9.8
TOTAL PULPS	23.8	23.2	44.6	43.6	70.5	69.6	102.7	101.2	153.0	150.3

Table 8.0.0.2

CENTRALLY PLANNED ECONOMIES OUTLOOK FOR WOOD PULPS

(Millions of Metric Tons)

	1960		1970		1980		1990		2000	
	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.
Softwoods										
Mechanical/Semi-Chemical	1.7	1.6	2.9	2.9	4.1	4.1	6.1	6.1	9.3	9.3
Unbleached Kraft	1.1	1.1	2.7	2.6	4.6	4.6	6.9	6.9	10.4	10.4
White Pulp	2.0	2.0	3.0	2.9	4.6	4.6	6.7	6.7	11.0	11.0
Dissolving Pulp	0.2	0.1	0.7	0.6	1.3	1.2	1.5	1.4	1.7	1.6
TOTAL SOFTWOODS	5.0	4.8	9.3	9.0	14.5	14.4	21.2	21.1	32.4	32.3
Hardwoods										
Mechanical/Semi-Chemical	-	-	0.3	0.3	0.9	0.9	1.2	1.2	1.9	1.9
Unbleached Kraft	-	-	-	-	0.1	0.1	0.1	0.1	0.2	0.2
White Pulp	0.6	0.6	0.9	0.9	1.5	1.5	2.5	2.5	3.2	3.2
Dissolving Pulp	0.1	0.1	0.2	0.2	0.3	0.2	0.3	0.3	0.3	0.3
TOTAL HARDWOODS	0.7	0.7	1.4	1.4	2.7	2.6	4.1	4.1	5.6	5.6
Total Pulps										
Mechanical/Semi-Chemical	1.7	1.6	3.2	3.2	4.9	4.9	7.4	7.3	11.2	11.2
Unbleached Kraft	1.1	1.1	2.7	2.6	4.6	4.6	7.0	7.0	10.6	10.6
White Pulp	2.6	2.6	3.9	3.8	6.0	6.0	9.2	9.2	14.2	14.2
Dissolving Pulp	0.3	0.2	0.9	0.8	1.6	1.4	1.8	1.7	2.0	1.9
TOTAL PULPS	5.7	5.5	10.7	10.4	17.2	17.0	25.3	25.2	38.0	37.9

Table 8.0.1.1

EASTERN EUROPE OUTLOOK FOR WOOD PULPS

(Fiber Volume, Millions of Cubic Meters)

	1960		1970		1980		1990		2000	
Softwoods	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.
Mechanical/Semi-Chemical	1.4	1.4	2.1	2.1	2.8	2.8	4.3	3.5	6.8	4.1
Unbleached Kraft	1.0	1.0	2.8	2.3	4.7	4.7	6.7	5.1	10.0	5.3
White Pulp	3.0	3.0	3.2	3.0	7.1	4.4	11.2	4.8	18.5	5.0
Dissolving Pulp	1.1	0.5	1.3	0.9	1.7	1.0	1.7	1.1	1.8	1.2
TOTAL SOFTWOODS	6.5	5.9	9.4	8.3	16.3	12.9	23.9	14.5	37.1	15.6
Hardwoods										
Mechanical/Semi-Chemical	-	-	0.2	0.2	0.7	0.8	1.0	1.0	1.1	1.1
Unbleached Kraft	-	-	0.1	0.1	0.2	0.2	0.5	0.5	0.8	0.8
White Pulp	2.0	2.0	2.4	2.4	3.2	3.2	5.1	4.2	6.1	4.3
Dissolving Pulp	0.6	0.6	1.1	1.1	1.3	1.3	1.4	1.4	1.5	1.5
TOTAL HARDWOODS	2.6	2.6	3.8	3.8	5.4	5.5	8.0	7.1	9.5	7.7
Total Pulps										
Mechanical/Semi-Chemical	1.4	1.4	2.3	2.3	3.5	3.6	5.3	4.5	7.9	5.2
Unbleached Kraft	1.0	1.0	2.9	2.4	4.9	4.9	7.2	5.6	10.8	6.1
White Pulp	5.0	5.0	5.6	5.4	10.3	7.6	16.3	9.0	24.6	9.3
Dissolving Pulp	1.7	1.1	2.4	2.0	3.0	2.3	3.1	2.5	3.3	2.7
TOTAL PULPS	9.1	8.5	13.2	12.1	21.7	18.4	31.9	21.6	46.6	23.3

Table 8.0.1.2

EASTERN EUROPE OUTLOOK FOR WOOD PULPS

(Millions of Metric Tons)

	1960		1970		1980		1990		2000	
Softwoods	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.
Mechanical/Semi-Chemical	0.5	0.5	0.8	0.8	1.0	1.0	1.6	1.3	2.5	1.5
Unbleached Kraft	0.2	0.2	0.6	0.5	1.0	1.0	1.4	1.1	2.1	1.1
White Pulp	0.5	0.5	0.6	0.5	1.3	0.8	2.1	0.9	3.6	1.0
Dissolving Pulp	0.2	0.1	0.2	0.1	0.3	0.2	0.3	0.2	0.3	0.2
TOTAL SOFTWOODS	1.4	1.3	2.2	1.9	3.6	3.0	5.4	3.5	8.5	3.8
Hardwoods										
Mechanical/Semi-Chemical	-	-	0.1	0.1	0.3	0.3	0.3	0.3	0.4	0.4
Unbleached Kraft	-	-	-	-	0.1	0.1	0.1	0.1	0.2	0.2
White Pulp	0.4	0.4	0.5	0.5	0.8	0.8	1.1	0.9	1.4	1.0
Dissolving Pulp	0.1	0.1	0.2	0.2	0.3	0.2	0.3	0.3	0.3	0.3
TOTAL HARDWOODS	0.5	0.5	0.8	0.8	1.5	1.4	1.8	1.6	2.3	1.9
Total Pulps										
Mechanical/Semi-Chemical	0.5	0.5	0.9	0.9	1.3	1.3	1.9	1.6	2.9	1.9
Unbleached Kraft	0.2	0.2	0.6	0.5	1.1	1.1	1.5	1.2	2.3	1.3
White Pulp	0.9	0.9	1.1	1.0	2.1	1.6	3.2	1.8	5.0	2.0
Dissolving Pulp	0.3	0.2	0.4	0.3	0.6	0.4	0.6	0.5	0.6	0.5
TOTAL PULPS	1.9	1.8	3.0	2.7	5.1	4.4	7.2	5.1	10.8	5.7

Table 8.0.2.1

USSR OUTLOOK FOR WOOD PULPS

(Fiber Volume, Millions of Cubic Meters)

	1960		1970		1980		1990		2000	
Softwoods	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.
Mechanical/Semi-Chemical	2.5	2.5	4.3	4.3	5.9	5.9	8.5	9.3	12.4	15.1
Unbleached Kraft	3.6	3.6	8.8	8.8	14.8	14.8	21.8	23.2	33.1	37.1
White Pulp	5.5	5.5	9.5	9.5	11.8	14.2	16.1	21.9	26.5	38.9
Dissolving Pulp	-	-	2.9	3.0	5.3	5.3	6.2	6.2	7.1	7.1
TOTAL SOFTWOODS	11.6	11.6	25.5	25.6	37.8	40.2	52.6	60.6	79.1	98.2
Hardwoods										
Mechanical/Semi-Chemical	-	-	0.5	0.5	1.5	1.5	2.4	2.4	3.8	3.8
Unbleached Kraft	-	-	-	-	-	-	-	-	-	-
White Pulp	-	-	0.4	0.4	1.0	1.0	2.7	3.5	3.2	4.7
Dissolving Pulp	-	-	-	-	-	-	-	-	-	-
TOTAL HARDWOODS	-	-	0.9	0.9	2.5	2.5	5.1	5.9	7.0	8.5
Total Pulps										
Mechanical/Semi-Chemical	2.5	2.5	4.8	4.8	7.4	7.4	10.9	11.7	16.2	18.9
Unbleached Kraft	3.6	3.6	8.8	8.8	14.8	14.8	21.8	23.2	33.1	37.1
White Pulp	5.5	5.5	9.9	9.9	12.8	15.2	18.8	25.4	29.7	43.6
Dissolving Pulp	-	-	2.9	3.0	5.3	5.3	6.2	6.2	7.1	7.1
TOTAL PULPS	11.6	11.6	26.4	26.5	40.3	42.7	57.7	66.5	86.1	106.7

Table 8.0.2.2

USSR OUTLOOK FOR WOOD PULPS

(Millions of Metric Tons)

	1960		1970		1980		1990		2000	
Softwoods	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.
Mechanical/Semi-Chemical	1.0	0.9	1.6	1.6	2.2	2.2	3.1	3.4	4.6	5.6
Unbleached Kraft	0.9	0.9	2.1	2.1	3.6	3.6	5.5	5.8	8.3	9.3
White Pulp	1.2	1.2	2.0	2.0	2.5	3.0	3.4	4.6	5.5	8.1
Dissolving Pulp	-	-	0.5	0.5	1.0	1.0	1.2	1.2	1.4	1.4
TOTAL SOFTWOODS	3.1	3.0	6.2	6.2	9.3	9.8	13.2	15.0	19.8	24.4
Hardwoods										
Mechanical/Semi-Chemical	-	-	0.2	0.2	0.6	0.6	0.9	0.9	1.5	1.5
Unbleached Kraft	-	-	-	-	-	-	-	-	-	-
White Pulp	-	-	0.1	0.1	0.3	0.3	0.7	0.9	0.8	1.2
Dissolving Pulp	-	-	-	-	-	-	-	-	-	-
TOTAL HARDWOODS	-	-	0.3	0.3	0.9	0.9	1.6	1.8	2.3	2.7
Total Pulps										
Mechanical/Semi-Chemical	1.0	0.9	1.8	1.8	2.8	2.8	4.0	4.3	6.1	7.1
Unbleached Kraft	0.9	0.9	2.1	2.1	3.6	3.6	5.5	5.8	8.3	9.3
White Pulp	1.2	1.2	2.1	2.1	2.8	3.3	4.1	5.5	6.3	9.3
Dissolving Pulp	-	-	0.5	0.5	1.0	1.0	1.2	1.2	1.4	1.4
TOTAL PULPS	3.1	3.0	6.5	6.5	10.2	10.7	14.8	16.8	22.1	27.1

Table 8.0.3.1

CENTRALLY PLANNED ASIA OUTLOOK FOR WOOD PULPS

(Fiber Volume, Millions of Cubic Meters)

	1960		1970		1980		1990		2000	
Softwoods	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.
Mechanical/Semi-Chemical	0.5	0.5	1.5	1.5	2.7	2.7	4.2	4.2	6.7	6.7
Unbleached Kraft	-	-	-	-	-	-	-	-	-	-
White Pulp	1.7	1.7	2.2	2.2	4.2	4.2	5.9	5.9	9.3	9.3
Dissolving Pulp	-	-	-	-	-	-	-	-	-	-
TOTAL SOFTWOODS	2.2	2.2	3.7	3.7	6.9	6.9	10.1	10.1	16.0	16.0
Hardwoods										
Mechanical/Semi-Chemical	-	-	-	-	-	-	-	-	-	-
Unbleached Kraft	-	-	-	-	-	-	-	-	-	-
White Pulp	0.9	0.9	1.3	1.3	1.6	1.6	3.0	3.0	4.3	4.3
Dissolving Pulp	-	-	-	-	-	-	-	-	-	-
TOTAL HARDWOODS	0.9	0.9	1.3	1.3	1.6	1.6	3.0	3.0	4.3	4.3
Total Pulps										
Mechanical/Semi-Chemical	0.5	0.5	1.5	1.5	2.7	2.7	4.2	4.2	6.7	6.7
Unbleached Kraft	-	-	-	-	-	-	-	-	-	-
White Pulp	2.6	2.6	3.5	3.5	5.8	5.8	8.9	8.9	13.6	13.6
Dissolving Pulp	-	-	-	-	-	-	-	-	-	-
TOTAL PULPS	3.1	3.1	5.0	5.0	8.5	8.5	13.1	13.1	20.3	20.3

Table 8.0.3.2

CENTRALLY PLANNED ASIA OUTLOOK FOR WOOD PULPS

(Millions of Metric Tons)

	1960		1970		1980		1990		2000	
	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.	Cons.	Prod.
Softwoods										
Mechanical/Semi-Chemical	0.2	0.2	0.5	0.5	0.9	0.9	1.4	1.4	2.2	2.2
Unbleached Kraft	-	-	-	-	-	-	-	-	-	-
White Pulp	0.3	0.3	0.4	0.4	0.8	0.8	1.2	1.2	1.9	1.9
Dissolving Pulp	-	-	-	-	-	-	-	-	-	-
TOTAL SOFTWOODS	0.5	0.5	0.9	0.9	1.7	1.7	2.6	2.6	4.1	4.1
Hardwoods										
Mechanical/Semi-Chemical	-	-	-	-	-	-	-	-	-	-
Unbleached Kraft	-	-	-	-	-	-	-	-	-	-
White Pulp	0.2	0.2	0.3	0.3	0.4	0.4	0.7	0.7	1.0	1.0
Dissolving Pulp	-	-	-	-	-	-	-	-	-	-
TOTAL HARDWOODS	0.2	0.2	0.3	0.3	0.4	0.4	0.7	0.7	1.0	1.0
Total Pulps										
Mechanical/Semi-Chemical	0.2	0.2	0.5	0.5	0.9	0.9	1.4	1.4	2.2	2.2
Unbleached Kraft	-	-	-	-	-	-	-	-	-	-
White Pulp	0.5	0.5	0.7	0.7	1.2	1.2	1.9	1.9	2.9	2.9
Dissolving Pulp	-	-	-	-	-	-	-	-	-	-
TOTAL PULPS	0.7	0.7	1.2	1.2	2.1	2.1	3.3	3.3	5.1	5.1

PHASE V

WORLD OUTLOOK FOR TIMBER SUPPLY

PHASE V

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PHASE V

WORLD OUTLOOK FOR TIMBER SUPPLY

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INTRODUCTION

1.0 INTRODUCTION

1.1 SUMMARY

This report to the Food and Agricultural Organization of the United Nations is the final section of the world forest industries' outlook to the year 2000. It contains fiber supply forecasts for industrial roundwood and plant by-products. The report separates the roundwood supply into coniferous ("softwood") and non-coniferous ("hardwood") fiber categories as well as dividing the logs into "sawlogs" and "fiber logs".

The supply outlook presented in this report is consistent with the fiber consumption projections of Phase IV. Each region's capability to supply the necessary logs to support the Phase IV outlook has been carefully evaluated. The generation and potential use of by-product mill residuals has also been assessed. The potential for interregional log flows has been evaluated in both political and economic terms. A global balance between supply and consumption has been forced for each time period. Recognizing that log supply and consumption must be equal in the long run, the Working Party has tailored its Phase V supply outlook to achieve that balance. This has necessarily required numerous compromises between potential consumption and realistic supply.

The reader of this report should, therefore, interpret the forecast presented as a feasible outcome, not a specific solution. The reader is further reminded that portions of the demand outlook, particularly pulp growth in the 1990-2000 period, are extrapolations of projected trends and therefore rest on a weak footing. Some weaknesses also exist in the supply base, both projected and historical. For these reasons this report might most appropriately be considered as a discussion document which highlights the emerging trade-offs between products and regions rather than a definitive outlook.

1.2 BACKGROUND

This report is the final phase of a joint effort by forestry and industry to define for FAO the world outlook for forest products. It is derived from an assessment by regional experts on world timber supply which has been conducted during the Spring and Summer of 1978. Readers are referred to Phase IV for a detailed description of the genesis of this study and its charter.

The Working Party which has prepared this outlook includes experts from industry, academia and forestry. In general, industry representatives have determined the production patterns which are projected for each product and region. The timber projections which underlie those production forecasts have, for most major producing countries, been grounded on the timber removals forecasts prepared by government experts. Thus, for these countries this final stage represents a blending of industry's view about consumption trends with an appraisal by government experts of their regions' timber supply capabilities.

1.3 OBJECTIVES

The basis objective of Phase V has been to develop a realistic outlook for the world's capability to supply its needs for industrial roundwood in the 1980-2000 period. The probable demand for forest products has been developed in the first four phases of the study.

Supplemental objectives of this study relate to the availability of suitable logs by fiber type and quality. The Working Party has assessed the potential impact on the softwood and hardwood supplies of the Phase IV growth projections. Similarly it has inspected the relative pressure on sawlogs and pulpwood (referred to in this report as fiber logs when in roundwood form). A further objective has been to identify the potential share of a region's pulpwood requirements which potentially would be filled by by-products residuals.

1.4 APPROACH

To develop its fiber supply outlook the Working Party has used primarily individual country studies as its base for analysis. The approach to obtaining and analyzing this base, however, has differed by region.

For many industrialized countries, particularly in Europe and Japan, the Working Party has used as its base the timber supply studies which are prepared periodically by government forestry departments. The European outlook has been coordinated by the United Nations Economic Commission for Europe which has contacted each country before updating for this study the supply projections presented in the FAO/ECE Timber Bulletin for Europe, European Timber Trends and Prospects, 1950 to 2000. The Japanese outlook has been developed by the Ministry of Agriculture and Forestry. For North America, however, a significant proportion of the regional outlook has been developed directly by Working Party members using its own approach to analyzing inventory and age class statistics provided by the national forest services. In any event, the Working Party has applied its experience to these preliminary supply outlooks and modified them where it deemed appropriate. Most modifications of this type have been minor. It is possible, however, that the Working Party's outlook for the United States South may differ significantly from that which will be presented by the United States Forest Service when it publishes its next outlook for timber supplies.

For most developing countries, FAO has supported the Working Party in preparing the outlook. Detailed assessments have been made by FAO of those countries affording the greatest possible potential for expanded timber supplies. Particular attention has been paid to Far East countries in the ASEAN group plus Latin America's leading potential timber producers: Argentina, Brazil, Chile and Mexico. The Working Party has cooperated with FAO in preparing these assessments and believes the supply outlooks presented here to be reasonable, although they are considerably less than the possible levels estimated by FAO should demand prove higher than foreseen.

The outlook for the Centrally Planned Economies has been drawn from multiple sources. Eastern Europe's outlook has again been coordinated by ECE. The U.S.S.R. outlook has been developed by the Working Party to match log supply with projected consumption; this projected growth in log production has been tested against ECE's outlook and considered reasonable, For Centrally Planned Asia the Working Party has effectively forced log supply to equal consumption, relying on the limited documents used in preparation of Phase IV for its indication of industrial roundwood potential.

As noted in the summary, the Working Party has forced a balance between timber supplies and projected global consumption. The question naturally arises whether world consumption is projected to fall below that level which would exist without timber scarcity. Clearly there is some relationship between timber cost and its consumption. If industrial roundwood were to be in more plentiful supply at no increase in cost, world consumption would undoubtedly rise. This automatically raises the related question of demand elasticity. The Working Party has not tried to measure this factor directly; it has, however, attempted to estimate empirically the impact on consumption of changes in real timber costs which are generally rising throughout the world.

The Working Party's decision to force a balance between timber supplies and consumption has created certain anomolies in the net trade forecasts. These trade accounts imply that raw fiber will physically move to or from the subregions where the deficits or surpluses are noted. In some cases the Working Party believes that the quantity and perhaps even the direction of the projected fiber flows for the 1980-2000 period is doubtful. To adjust these flows, however, would have required further iterations associated with both the consumption and production of wood products for Phase IV, which was precluded by the Working Party's timetable and staffing. Accordingly, those flows which appear particularly unlikely have been designated on the supply tables with an asterisk and their signifance has been discussed in the text.

The reader is reminded of fuelwood's omission from this study. The increasing real price of energy will undoubtedly deflect fuelwood's historical downward slide in the developed market economies. The Working Party has not dealt directly with the issue of fuelwood consumption, electing instead to focus on fuelwood's equivalent energy value. After considering the higher cost which industrial fiber users typically incur, particularly in fiber deficit regions, the Working Party has decided to avoid further analysis of the fuelwood issue. It recognizes that fuelwood's consumption could stabilize or even grow in the industrialized countries but expects that forest products producers can bid their fiber requirements away from the energy sector. Accordingly, it has typically projected that fuelwood's share of the harvest in developed countries will decline still further. A parallel situation is considered likely in any developing country which is fiber poor. The fiber rich countries are assumed almost by definition to have an adequate potential supply of fuelwood to meet those energy needs which would naturally be filled by wood fibers. Although this approach to fuelwood competition is very simplistic, the Working Party has felt a more detailed assessment to be beyond its manpower and timetable limitations.

1.5 HISTORICAL DATA BASE

The Working Party has primarily relied on FAO's annual statistics for developing its historical data base. It has used this information in assessing regional supply capabilities and trends. To test the impact of its products' forecast against these supply statistics, however, the Working Party has created pro forma estimates for each sub-region's historical supply. These estimates have been developed by calculating the theoretical fiber demand which each product would place on a region's log supply. The impact of by-product residuals has been analyzed as a substitute fiber source for roundwood. Interregional trade has also been assessed to account for log flows between deficit and surplus regions.

The Working Party has decided to show the difference between these calculations and the "actual" removals as reported by FAO. To the extent that these numbers differ from each other, the Working Party's future estimates of log demand could be in error. In most cases the Working Party's conversion factors and residuals consumption estimates do create an historical log consumption level which is quite close to that reported by FAO. By comparing the calculated and reported numbers, readers can thus evaluate the Working Party's relative effectiveness in relating estimated log consumption to reported log supply.

Users of FAO statistics are well aware of the typical discrepancy which exists between reported imports and exports. Since world exports must, on average, equal world imports, there is clearly a degree of error in national statistics reported to FAO. The Working Party has examined the reported trade patterns and then applied its judgment to the discrepancies for 1960 and 1970. Thus it has again deviated from the reported statistics in order to force an historical balance.

1.6 STATISTICAL TABLES

The statistics for Phase V are reported in two sets of tables for each of the six regions and seventeen sub-regions. The first set of tables shows by sub-region the Working Party's calculation base for the demand on its forests. These tables first show the net log demand which the forest must supply to create the products which Phase IV has assumed to be produced. This log demand has then been adjusted for estimated log trade and residuals usage. Thus the first set of tables shows by log and fiber type how much roundwood each sub-region's forest needs to supply to create the reported production of products.

The second series of tables is merely a reordering of the key regional supply information from the first set with one significant addition. FAO's reported supply for softwoods and hardwoods 1970 is shown so that the Working Party's calculation base can be readily compared with FAO's basis. As noted above, the net trade flows shown on some tables have been identified with an asterisk to designate the Working Party's awareness that the physical movements of raw fiber which they imply are unlikely to occur.

1.7 DEFINITIONS

The products forecast in this report follow the basic definitions used by FAO for reporting forest product statistics. The Working Party has, however, adopted two terms which are not used by FAO on page XIV of its 1976 Yearbook of Forest Products. The first of these terms is "fiber logs" which is a combination of pulpwood (category 246.01) plus pitprops and other industrial roundwood (category 247.9). The second term is "residuals" which is the part of the combination of wood chips, particles and residues (categories 246.02 and 246.03) which is not derived directly from roundwood. The term "sawlog" as used in this report refers to both sawlogs and veneer logs (category 247.1/2).

All statistics used in this report relate to the "fiber volume" of a given product. As noted in paragraph 1.6 of Phase IV the "fiber volume" for sawnwood and plywood is equivalent to their "product volume". For reconstituted panels, however, the density differences between the raw wood and the finished product cause the two factors to be different. Wood pulps throughout Phase V are discussed in terms of their fiber equivalent. Reported fiber volumes for roundwood or roundwood equivalents exclude bark. Thus the "gross wood-in-the-rough" required for products such as sawnwood and veneer includes the fiber volume in the product produced plus the residuals created, but no bark.

As in Phase IV, the fiber types have been separated into "softwoods" and "hardwoods". The "softwoods" comprise those species identified on page XIII of the 1976 Yearbook of Forest Products as coniferous. "Hardwoods" are the non-coniferous or "broadleaved" species.

1.8 RESPONSIBILITY FOR OUTLOOK PRESENTED

As noted above, the supply picture presented in Phase V is fundamentally the outlook prepared by government forestry agencies in most major producing countries. The Working Party has in most cases made only minor adjustments to these supply outlooks. Its typical adjustments are well within the expected margins of error for forest inventory and harvest. These modifications have occurred during the iterative process of matching product requirements with log supply after the basic demand outlook had been created. In some cases such as North American hardwoods, the Working Party has not shown the region's entire potential to be harvested because of inadequate demand. In those situations such as Japan where the Working Party considers that a region's supply outlook has possibly been overstated, it has incorporated the basic government view in its statistics and then commented upon it in the text.

Thus the supply outlook presented in the report's statistics should in almost all cases be fully acceptable to the government forestry agencies which have supplied timber supply forecasts. Where no supply forecasts were obtained, estimates are based on available resource information and historical removal figures. However, it is the Working Party which has created the final outlook and is responsible for the views presented in this report.

WORLD OUTLOOK

2.0 WORLD OUTLOOK

The world's supply of industrial roundwood is considered adequate to meet its growing fiber needs throughout the balance of this century. Global demand for wood fiber is expected to rise 1.8% annually between 1980 and 2000, down slightly from the 2.4% rate estimated to prevail in the 1960-80 period. The gross wood-in-the-rough required to meet these growth projections is expected to rise from 1661 million cbm (cubic meters) in 1980 to 2388 million cbm in 2000.[1] After rising from 5.7% in 1960 to an estimated 11.4% in 1980, the share which mill residuals represent of total products consumed is expected to peak around 1990 at about 12.7%. This share of mill residuals is stabilized after 1990 because the industrialized regions should by that time have fully tapped their economically accessible residuals and the roundwood based industries of the developing world should be gaining share of total products produced. The net demand on the forest created by forest-based industry is a projected growth from 1471 million cbm in 1980 to 2086 million cbm in 2000.

2.1 WORLD OUTLOOK FOR SOFTWOODS

2.1.1 DEMAND OUTLOOK

The world's consumption of softwood industrial roundwood is expected to rise from 1027 million cbm in 1980 to 1412 million cbm in 2000. This increase represents an annual growth rate of only 1.6%, down slightly from the 1.8% level estimated for the 1960-80 period. Implicit in this change is a reduction of softwood's share of industrial roundwood from 74% in 1960 to 70% and 68% in 1980 and 2000 respectively. Table 2.0.1.1 shows the Working Party's outlook for softwood supplies to 2000.

The use of sawmill residuals for forest products is expected to climb from 158 million cbm in 1980 to 249 million cbm in 2000. This growth is projected despite the increasing competition of the energy sector for fuelwood. On a share basis, this represents an estimated increase from 13.3% of the industry's supply in 1980 to 15.0% in 2000. Thus, the gross wood-in-the-rough demanded for softwood products should rise from 1185 million cbm in 1980 to 1661 million cbm by 2000.

2.1.2 SUPPLY OUTLOOK

Global softwood supply should be adequate to meet the world's growing needs, but some change in the regional supply pattern for industrial softwoods is expected during the 1980-2000 period. North America's share of world supply, for example, is expected to decline from 38.8% in 1980 to 34.2% in 2000. Western Europe is also expected to lose share during that period, falling from 17.7% to 16.4%. Japan, however, is optimistic that

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[1] i.e., without eliminating double counting of residuals used in further processing.

its reforestation program will yield sufficient fiber to raise its share of industrial softwoods from 2.5% to 3.5%. Latin America's afforestation projects should increase its share from 2.2% to 4.4%. A similar growth is projected in Other Eastern Hemisphere countries as plantations in Oceania raise the region's share from 2.5% to 5.0%. The Centrally Planned Economies, however, are expected to maintain a stable share in the range of 36.3% as the Soviet Union offsets the relatively low fiber growth in Eastern Europe by expanding its removals east of the Urals.

One of the study's objectives has been to inspect the potential growth for solidwood and reconstituted wood products relative to the available supply. As noted in paragraphs 1.3 and 1.5, the Working Party has ultimately forced a balance between its projections for global timber consumption and supplies. The question of world supply, therefore, is not one of whether it exceeds demand, because demand is merely a schedule of consumption levels at various prices. The question instead is one of whether the consumption of each product within a region can continue growing at the rate which one would select after analyzing historical trends and growth parameters.

The Working Party has assessed the probable growth of softwood solidwood products and found that world supply should be adequate to meet its projections. Demand growth for sawlogs should taper off somewhat from the 1.6% of the 1960-80 period to a 1.2% level between 1980 and 2000. This reduced growth rate arises from the Working Party's forecast of demographic trends and slower world economic growth. Adequate supplies to meet the projected growth from 676 to 862 million cbm should be available, but they are expected to be very tight in the developed market economies. The demand for softwood fiber logs is expected to grow somewhat more rapidly, holding its 2.3% growth rate of the 1960-80 period during the ensuing two decades. Again, there should be adequate but extremely tight supply. In other words, output of both softwood sawlogs and fiber logs is expected to be stretched close to their physical supply limits by 2000.

One approach to assessing this projected softwood tightness is to calculate the annual supply increment which must be added to sustain growth in consumption. Globally this increment should exceed 20 million cbm before 2000. It is certainly feasible to afforest annually the one to two million hectares of arable land which the world may need to meet its growth in softwood consumption. Brazil alone has in recent years added about 100,000 hectares of softwood plantations annually. The People's Republic of China alone is believed to have afforested more than a million hectares of timberland annually in recent years. Alternatively, it may be possible to gain some of this increment from a fiber surplus country such as the Soviet Union, but the projected annual growth in removal of 5.7 million cbm between 1980 and 2000 is already likely to stretch its expansion capabilities. In either event a severe softwood supply deficit appears on the horizon which will likely constrain the natural growth of softwood products consumption within two decades.

2.1.3 SELF-SUFFICIENCY TRENDS

Concurrent with the projected softwood roundwood scarcity, the Working Party has projected a minor decrease in regional self-sufficiency. By self-sufficiency, the Working Party means the relationship between logs processed and logs produced. Interregional shipments[1] of softwood sawlogs, for example, are expected to rise from 22.7 million cbm in 1980 to 32.3 million cbm in 2000. Total sawlog consumption, however, is projected to grow more slowly so that interregional softwood sawlog shipments should increase from 3.4% to 3.7% of world supply.

The outlook for softwood fiber log and residual shipments is for a slight increase in regional self-sufficiency. Interregional shipments are estimated to rise from 18.6 million cbm in 1980 to 28.0 million cbm by 2000. By comparison, the consumption of fiber logs and residuals should rise from 509.4 million cbm to 799.4 million cbm. Thus interregional shipments of pulpwood and residuals should decline from 3.7% to 3.5% of total consumption.

2.2 WORLD OUTLOOK FOR HARDWOODS

2.2.1 DEMAND OUTLOOK

World consumption of hardwood industrial roundwood is forecast to rise from 443.4 million cbm in 1980 to 673.2 million cbm in 2000. This annualized growth rate of 2.1% is projected to be down significantly from the 2.8% rate which is estimated for the 1960-80 period. Sawlogs are expected to continue their steady decline as a percent of total industrial hardwood, falling from 59% in 1960 to an estimated 52% and 48% in 1980 and 2000 respectively. Table 2.0.2.1 shows the Working Party's outlook for hardwoods through the year 2000.

The outlook for growth in world consumption of hardwood sawlogs is quite strong. An additional 90.6 million cbm of sawlogs are projected as a requirement in the 1980 to 2000 period. This represents an increase of 39.5% above 1980's estimated level of 229.3 million cbm. The annualized growth rate of 1.7% is down slightly from the 2.1% level for the 1960-80 period, primarily because of a projected lower growth in the consumption of hardwood plywood which should taper off markedly due to log supply limitations.

The world's projected growth in demand for hardwoods, however, is primarily expected to be driven by that of pulp products. Of the 215.3 million cbm incremental consumption between 1980 and 2000, 131.6 million cbm or 52% is projected for the pulp sector. An additional 22.3 million cbm increment is forecast to

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[1] Sum of <u>net</u> shipments of the six major regions, which is much less than those of the countries or even of the 17 subregions.

be incorporated into reconstituted panels. Thus 61% of the world's growth in the consumption of hardwood products is projected for industries which are potentially grounded on residuals.

The generation of residuals in the 1980 to 2000 period, however, is not projected to be so rapid. The Working Party expects the incremental growth in residuals generated to be only 36.0 million cbm. Its estimate for reuse of residuals rises only by 21.5 million cbm in that period. Thus, the residuals increment should not quite be enough to cover the projected needs of the world's reconstituted panel growth. Over 132 million cbm of fiber logs should effectively be needed for the world's pulp industry.

2.2.2 SUPPLY OUTLOOK

The world's supply of hardwood logs is expected to increase from 443.4 million cbm to 673.2 million cbm in the 1980-2000 period. This projected increase of 229.8 million cbm represents an annualized growth rate of 2.1%, down significantly from the 2.8% rate of the 1960-1980 period.

With the exception of Japan, all regions are expected to expand their hardwood supplies, but their shares of world industrial hardwood roundwood are expected to shift somewhat. North America is expected to increase its share of hardwood logs slightly from 23% in 1980 to 24% in 2000. Western Europe is expected to lose share of world supply slightly, declining from 16% in 1980 to 14% by 2000. Japan's domestic hardwood log supply is expected to fall in absolute terms from 15.4 million cbm to 8.5 million cbm, implying a drop in world share from 3% in 1980 to 1% by 2000. Latin America's share should increase from 7% to 9% during that period. The biggest shift is projected for the Other Eastern Hemisphere region which is forecast to increase its share from 30% in 1980 to 35%. By comparison, the Centrally Planned Economies are expected to experience the greatest share loss, falling from 21% in 1980 to 17% by 2000.

The Working Party has carefully inspected the potential for high quality hardwood sawlogs and determined that an emerging shortage of such material will restrain the growth of solidwood hardwood products. The traditional supplying regions for sawlogs such as luaun and meranti are rapidly depleting their supplies. Although a major growth in supply is still feasible through the turn of the century, domestic needs of the producing regions are expected to limit the availability of sawlogs for export. Exports of hardwood sawlogs from the major supplying sub-region, the Far East, are expected to decline from 19.4 million cbm in 1980 to 9.2 million cbm by 2000. Although tropical Africa has the potential to offset this decline somewhat, even continuation of the current level of exports is becoming uncertain.

The world's potential supply of hardwood fiber logs continues to appear extremely abundant. Temperate zone hardwoods in France and the United States, for example, are projected to be still under-utilized by the turn of the century. Mixed tropical hardwoods in Africa, Latin America and the Far East could provide, in mere quantities, for more than the industrial world's wood requirements. Accordingly, the issue of hardwood fiber logs is not one of physical supply but rather of quality and economic supply. The Working Party has postulated increasing utilization of these logs in all of the above regions but observes that the patterns of consumption could readily shift between those regions in meeting the world's pulp requirements.

2.2.3 SELF-SUFFICIENCY TRENDS

Self-sufficiency in hardwood logs takes on a different aspect than softwoods. As noted above, the world's interregional shipments of sawlogs are expected to decline both in absolute and percentage terms because of increased domestic conversion. Thus sawlogs shipped in interregional trade are expected to drop from 24.8 million cbm, or 11% of world consumption, in 1980 to 18.8 million cbm, or 6% or world consumption, in 2000. On the other hand, the currently very limited interregional shipments of pulpwood should increase as Japan shifts toward importing a large portion of hardwood fiber logs or chips for its pulp requirements. By 2000 interregional shipments of hardwood pulpwood and residuals should rise from 6.7 million cbm in 1980 to 24.4 million cbm. Based on a projected consumption growth from 246.4 million cbm to 407.1 million cbm, the amount of hardwood pulpwood and residuals entering interregional trade is expected to rise from 2.7% in 1980 to 6.0% in 2000.

TABLE 2.0.1.1

WORLD

ESTIMATED DEMAND ON THE FOREST FOR INDUSTRIAL SOFTWOOD

(Millions of Cubic Meters)

Sawlog Demand	1960	1970	1980	1990	2000
Sawnwood & Sleepers					
Product Volume	252.1	300.6	329.5	368.6	399.4
Residuals Created	222.3	262.0	293.5	341.8	387.9
Gross Wood-in-the-Rough	474.4	562.6	623.0	710.4	787.3
Solidwood Panels					
Product Volume	10.0	18.7	24.3	30.6	34.5
Residuals Created	11.8	21.5	28.2	35.3	40.2
Gross Wood-in-the-Rough	22.1	40.3	52.5	66.0	74.7
Dom. Sawlog Demand	496.4	602.9	675.5	776.4	862.0
Sawlog Trade-Exp(Imp)	-	-	-	-	-
Total Sawlog Demand	496.4	602.9	675.5	776.4	862.0
Fiberlog Demand					
Reconstituted Panels	12.0	35.0	61.4	81.0	100.7
Other Ind. Roundwood	74.4	66.9	68.5	67.7	67.7
Pulp	187.6	314.0	379.5	477.3	631.0
Subtotal Demand	274.0	415.9	509.4	626.0	799.4
Less:					
Residuals Reused	49.1	97.6	157.7	207.8	249.0
Dom. Fiberlog Demand	224.9	318.3	351.7	418.2	550.4
Fiberlog Trade-Exp(Imp)	-	-	-	-	-
Total Fiberlog Demand	224.9	318.3	351.7	418.2	550.4
TOTAL DEMAND FOR INDUSTRIAL SOFTWOODS	721.3	921.2	1027.2	1194.6	1412.4

TABLE 2.0.2.1

WORLD

ESTIMATED DEMAND ON THE FOREST FOR INDUSTRIAL HARDWOOD

(Millions of Cubic Meters)

Sawlog Demand	1960	1970	1980	1990	2000
Sawnwood & Sleepers					
Product Volume	73.5	91.2	99.3	123.9	143.1
Residuals Created	62.8	76.1	79.7	93.3	106.8
Gross Wood-in-the-Rough	136.3	167.3	179.0	217.2	249.9
Solidwood Panels					
Product Volume	6.8	17.3	24.1	29.6	35.0
Residuals Created	7.5	18.8	26.2	30.1	35.1
Gross Wood-in-the-Rough	14.3	36.1	50.3	59.3	70.0
Dom. Sawlog	150.6	203.4	229.3	276.5	319.9
Sawlog Trade-Exp(Imp)	-	-	-	-	-
Total Sawlog Demand	150.6	203.4	229.3	276.5	319.9
Fiberlog Demand					
Reconstituted Panels	7.2	19.9	32.9	44.1	55.2
Other Ind. Roundwood	69.4	77.3	81.5	83.6	88.3
Pulp	39.8	91.7	132.0	187.1	263.6
Subtotal Demand	116.4	188.9	246.4	314.8	407.1
Less:					
Residuals Reused	9.9	22.5	32.3	44.5	53.8
Dom. Fiberlog Demand	106.5	166.4	214.1	270.3	353.3
Fiberlog Trade-Exp(Imp)	-	-	-	-	-
Total Fiberlog Demand	106.5	166.4	214.1	270.3	353.3
TOTAL DEMAND FOR INDUSTRIAL HARDWOODS	257.0	369.8	443.4	546.8	673.2

Table 2.0.1.2

WORLD

ESTIMATED SUPPLY AND SELF-SUFFICIENCY TRENDS FOR INDUSTRIAL ROUNDWOOD

(Millions of Cubic Meters)

Softwoods	1960	1970	1980	1990	2000
Sawlogs					
Domestic Supply	496.4	602.9	675.5	776.4	862.0
Net Imports (Exports)	-	-	-	-	-
Sawlogs Consumed	496.4	602.9	675.5	776.4	862.0
Residuals Reused					
Domestic Supply	49.1	97.6	157.7	207.8	249.0
Net Imports (Exports)	-	-	-	-	-
Residuals Supplied	49.1	97.6	157.7	207.8	249.0
Fiber Logs					
Domestic Supply	224.9	318.3	351.7	418.2	550.4
Net Imports (Exports)	-	-	-	-	-
Fiber Logs Consumed	224.9	318.3	351.7	418.2	550.4
Softwood Logs Supplied	721.3	921.2	1027.2	1194.6	1412.4
FAO Report Basis		904.5			
Hardwoods					
Sawlogs					
Domestic Supply	150.6	203.4	229.3	276.5	319.9
Net Imports (Exports)	-	-	-	-	-
Sawlogs Consumed	150.6	203.4	229.3	276.5	319.9
Residuals Reused					
Domestic Supply	9.9	22.5	32.3	44.5	53.8
Net Imports (Exports)	-	-	-	-	-
Residuals Supplied	9.9	22.5	32.3	44.5	53.8
Fiber Logs					
Domestic Supply	106.5	166.4	214.1	270.3	353.3
Net Imports (Exports)	-	-	-	-	-
Fiber Logs Consumed	106.5	166.4	214.1	270.3	353.3
Hardwood Logs Supplied	257.0	369.8	443.4	546.8	673.2
FAO Report Basis		362.2			
TOTAL LOGS SUPPLIED	978.3	1291.0	1470.6	1741.4	2085.6

NORTH AMERICA

3.0 NORTH AMERICA

3.0.1 DEMAND OUTLOOK

Consumption of industrial roundwood in North America is projected to grow from 497.9 million cbm in 1980 to 642.4 million cbm in 2000. This growth rate of 1.3% per year is down from 2.0% annually in the 1960-80 period. North America should account for 31% of world-wide consumption of industrial roundwood in 2000, down slightly from 34% in 1960 and 1980. Softwood should continue to be the predominant species, but decline from 82% of consumption in 1960 to 80% in 1980 and 75% in 2000. Sawlogs are expected to represent 53% of the logs consumed in 2000, compared to 60-61% in the 1960-80 period.

3.0.2 SUPPLY OUTLOOK

In North America there are approximately 508 million hectares (1270 million acres) of commercial forest lands which hold an estimated 38 billion cbm of merchantable timber. About 72% of the North American inventory is softwood and 28% hardwood.

Canada's 312 million hectares (780 million acres) of commercial forest area is 92% Crown owned and supports nearly 18 billion cbm of merchantable timber; 14 billion cbm, or 80% of the inventory is softwood. The Western region, which includes British Columbia and Alberta, accounts for 52% of Canadian inventory. More than 90% of the Western inventory is softwood. Of the 8.5 billion cbm of merchantable timber in all other Canada, 68% is softwood and 32% hardwood.

There were 196 million hectares (490 million acres) of commercial timberland in the United States in 1976. Farmers and other private owners held 58% and the forest industry 14%. National forests and other public sectors accounted for 18% and 10% respectively. Ownership patterns vary substantially by region. In the Western United States, 52% of the commercial timberland is national forest land; whereas in the South and North, over 70% of the land is held by farmers and other private owners.

The United States held more than 20 billion cbm of roundwood growing stock in 1976. 9.6 billion cbm were in the West, 93% of which was softwood. The South held 6.0 billion cbm - 46% softwood, 54% hardwood. And the North accounted for the remaining 4.5 billion cbm, 73% of which was hardwood.

The Working Party has projected North American softwood and hardwood potential supply by examining annual growth of inventory and estimating harvest relative to expected growth for the various owner categories in each region. In the

United States, United States Forest Service projections were used as a starting point. And in Canada, the report Forest Management in Canada, by F.L.C. Reed & Associates Ltd., January 1978, served as a base in making projections for several of the provinces.

3.1 CANADA

3.1.1 OUTLOOK FOR SOFTWOODS

3.1.1.1 DEMAND OUTLOOK

Net demand for industrial softwood is projected to increase from 75.4 million cbm in 1960 to 130.9 million cbm in 1980, an annual growth rate of 2.8%. The growth is projected to slow to 1.2% per year in the 1980-2000 period.

Gross domestic pulpwood demand is projected to increase to 102.7 million cbm in 2000 from 72.5 million cbm in 1980, an annual growth of 1.8%. An increasing share of this demand will be met by residuals which are expected to account for 49% of the fiber consumed in pulp and panel products in 2000, up from 37% in 1980 and 10% in 1960. The net domestic demand for fiber logs, after subtracting residuals, is projected to rise from 45.5 million cbm in 1980 to 52.5 million cbm in 2000, an annual growth of 0.7%. No fiber log exports are expected.

Sawlogs should account for an increasing share of the Canadian net softwood demand. Up from 49% in 1960, sawlog consumption is expected to account for 65% of net demand in 1980 and 69% in 2000. Approximately 1% of the sawlog demand is expected to be exported during the forecast period.

3.1.1.2 SUPPLY OUTLOOK

The softwood supply in Canada is projected to increase from 167.7 million cbm in 1980 to 217.0 million cbm in 2000, an increase of 29%. Reused plant residuals are projected to account for 22% of the softwood supply in 1980 and 23% in 2000, up from just 6% in 1960. Of the residuals created by the solidwood processing industry, 52% should be reused domestically in the manufacture of fiber products in 1980 and 72% in 2000 compared to 18% in 1960. By the year 2000, virtually all material suitable for reuse will have to be consumed domestically in order to meet gross fiber log demand. In addition, an improvement in the utilization of timber cut is projected in response to the growing pulp industry in Canada. Of the projected increase in total supply between 1980 and 2000, 13.4 million cbm or 27% is from residuals, and another 7.4 million cbm or 15% results from improved use of logging residues.

A 36 million cbm increase in harvest, including the logging residues, has been projected for Canada between 1980 and 2000 - 27 million cbm in the West and 9 million in the East. In 1960 and 1970, the West (British Columbia and Alberta) accounted for about 50% of the softwood industrial harvest. The Working Party estimates that in 1980 the West will harvest 73.9 million cbm of industrial softwood roundwood. Another 12 million cbm is considered to be economically available in that year. In addition, between 1980 and 2000, more intensified forest management practices are projected to add another 4 million cbm to available supply in the West. To meet the Canadian projected softwood demand, the Working Party has forecast the construction of added infrastructure and manufacturing plants in order to fully utilize the economically available supply in 2000 in the West.

In 1980, the trend Eastern harvest is projected to be about 57 million cbm. Another 6 million cbm is estimated to be economically available within the region. The total supply in the East is not expected to change during the next two decades. The full economic supply is projected to be utilized to meet roundwood demand by 2000. The Eastern region (all Canada except British Columbia and Alberta) is expected to account for 39% of industrial softwood supply in 2000, down from 50% historically.

Canada has historically exported about 1% of its softwood sawlog supply. As indicated in Table 3.1.1.2 this trend is expected to continue. Sawlog exports are forecast to be 0.8 million cbm in 1980 and 1.0 million cbm by 2000.

As the solidwood processing industry grows to meet North American new housing demands over the next 5 to 8 years, an increasing volume of residuals should be available for export. Between 1990 and 2000, however, the growth in solidwood production is expected to slow significantly at the same time that large increases in pulp capacity have been projected. As a result, all available residuals should be needed to meet domestic demands. Residual exports from Canada are projected to be insignificant in 2000 after being as high as 11.7 million cbm in 1990.

3.1.2 OUTLOOK FOR HARDWOODS

3.1.2.1 DEMAND OUTLOOK

Net demand for industrial hardwoods in Canada is projected to increase from 11.9 million cbm in 1980 to 17.0 million cbm in 2000. The expected annual growth of 1.8% compares to a 5.1% historical rate. Hardwoods are projected to account for 8-9% of Canadian fiber demand during the next two decades, up from 6% in 1960.

Sawlog demand is expected to rise at a 1.5% annual rate from 1980 to 2000 but represent a declining share of industrial hardwood. In 1960, sawlogs accounted for 59% of net demand. This share is expected to decline to 40% in 1980 and 38% in 2000.

Gross pulpwood demand is projected to rise from 2.0 million cbm in 1960 to 8.7 million cbm in 1980 and further to 12.7 million cbm by 2000. The growth results from increasing demand for wood pulps and modest substitution of hardwoods for softwoods in pulp and panel products. Residuals should be utilized more extensively to meet pulpwood demand. In 1960 residuals accounted for 10% of the hardwood fiber consumed in pulp and panel products. This share is projected to increase to 17% to 18% between 1980 and 2000. After subtracting residuals, net fiber log demand is projected to increase from 7.1 million cbm in 1980 to 10.5 million cbm in 2000.

3.1.2.2 SUPPLY OUTLOOK

The supply of hardwood logs in Canada is projected to increase from 11.9 million cbm in 1980 to 17.0 million cbm in 2000, an increase of 43%. Hardwood plant residuals are projected to add 1.6 million cbm to supply in 1980 and increase slightly to 2.2 million cbm in 2000. Eastern Canada should account for more than 95% of the hardwood supply. The economically available supply in Eastern Canada is expected to remain at the current level of 20.1 million cbm. Of this supply, 61% is located in the two provinces of Ontario and Quebec. Available supplies are expected to exceed the industrial harvest by 8.2 million cbm in 1980 and 3.1 million cbm in 2000.

3.2 UNITED STATES

3.2.1 OUTLOOK FOR SOFTWOODS

3.2.1.1 DEMAND OUTLOOK

Net demand on the softwood forest by the United States processing industries is expected to increase from 201.1 million cbm in 1960 to 255.7 million cbm in 1980, an annual growth of 1.2%. The growth between 1980 and 2000 is projected to fall slightly to 0.9% per annum. The United States is likely to account for 22% of world-wide demand in 2000, down from 28% in 1960.

Gross fiber demand is projected to increase from 149.0 million cbm in 1980 to 199.9 million cbm by 2000, an annual growth of 1.5%. During the two decades between 1980 and 2000, 35% to 40% of this gross demand should be supplied by residuals, up from 20% in 1960 and 31% in 1970. After subtracting residuals, net demand on the forest for fiber logs then should increase from 90.1 million cbm in 1980 to 128.7 million cbm in 2000, a growth rate of 1.8%.

Domestic sawlog demand is expected to increase from 165.6 million cbm in 1980 to 179.3 million cbm in 2000. This 0.4% annual growth rate compares to the historical 1% rate. The lower growth is primarily a result of a peaking of the demand for new housing in the 1980's. Domestic sawlog demand should account for 58% of net softwood demand in 2000, down from 65% in 1980 and 67% in 1960.

3.2.1.2 SUPPLY OUTLOOK

Meeting the growing demand on the forest will put substantial pressure on softwood resources in the United States. The softwood supply is projected to increase from 267.2 million cbm in 1980 to 316.9 million cbm in 2000, an increase of 19%. The Working Party has projected that this supply will require roundwood harvest at practical maximum levels between 1990 and 2000. In addition, residuals will be used more extensively for the manufacture of pulp and panel products and should account for 18% to 20% of the total softwood supply during the forecast period, up from 7% in 1960. Of the residuals created by the solidwood processing industry, a projected 70% will be reused in 2000 compared to 67% in 1980 and just 21% in 1960. By 2000, essentially all of the material suitable for reuse should have to be consumed domestically in order to meet the growing pulpwood demand. In addition, improved utilization of the timber harvest is expected. Of the 65.8 million cbm increase in softwood supply projected between 1980 and 2000, 8.5 million cbm or 15% is from residuals and another 12.5 million cbm or 21% is from improved utilization of logging residues.

The primary reason for this tight demand/supply balance is the projected reduction in the supply of sawlogs in the Western region. The forest industry, with 11% of the Western commercial timberland, supplied 37% of the West's softwood sawtimber in 1970. The industry is currently depleting its old growth inventories, however, and is expected to liquidate most of them during the early 1980's. The harvest of second growth timber is not expected to compensate. In 1970, the national forests supplied 39% of Western sawtimber. Because of increasing pressure to reserve national forest land for recreation and wilderness areas, it is not likely that any increase in this owner category will significantly offset the decline in forest industry sawtimber removals. The Western sawlog supply, on trend, is projected to peak before 1980. Increasing pressure will then be put on the Southern region to meet domestic solidwood log demand.

The supply of softwood logs in the South is projected to increase nearly 30% between 1980 and 2000. It is estimated that 91% of the growth in the South will be available for harvest in 2000, compared to 76% in 1980. The Working Party projects the Southern share of United States domestic sawlog production to increase from 21% in 1960 to 35% in 1980 and 43% in 2000. To supply domestic needs, 82% of the timber of sufficient size for lumber and plywood will have to be utilized for solidwood processing, up from 72% in 1960 and 80% in 1980. A declining share of large size timber, then, should be available for pulpwood in the South. As the demand for pulp grows, increasing pressure should also be placed on the Southern fiber log supply. Because of the softwood constraints, the Working Party has assumed that hardwoods would represent a growing portion of fiber consumed in both unbleached kraft and white pulp produced in the South.

The North is projected to supply 7-8% of United States softwood logs in the next two decades, little change from its historical share.

The United States should continue to export sawlogs during the next two decades but chip supplies for export are likely to dwindle rapidly. As shown in Table 3.2.1.2, the United States supply of softwood logs is projected to grow to 316.9 million cbm in 2000 from 267.2 million cbm in 1980. Based on the continuing strength of Japanese demand, the United States is expected to continue to export sawlogs from the West. Exports are projected to decline from 11.5 million cbm in 1980 to 8.9 million cbm in 2000. Residual trade will be less stable. For the next 5 to 8 years, as solidwood production increases to meet housing demand, more residuals should be available for export. Between 1990 and 2000 the growth in solidwood production is expected to slow substantially while large increases in pulp capacity have been projected. As a result, all available residuals should be needed to meet pulpwood demand. Residual exports are projected to decline from 3.8 million cbm in 1980 to 1.6 million cbm in 1990, and, thereafter become insignificant.

3.2.2 OUTLOOK FOR HARDWOODS

3.2.2.1 DEMAND OUTLOOK

Net demand on United States forests for industrial hardwoods is projected to grow from 87.9 million cbm in 1980 to 141.7 million cbm in 2000. This growth of 2.4% annually is essentially unchanged from the 1960 to 1980 growth rate. The United States share of world-wide demand should average about 20% during the next two decades.

Hardwood sawlog demand should continue to grow slowly and account for just 23% of net hardwood demand in 2000, down from 51% in 1960 and 35% in 1980.

Gross pulpwood demand should be the fastest growing sector as United States pulp consumption grows and the hardwood share of pulp production increases between now and 2000. The hardwood share of pulp produced is projected to rise from 20% in 1960 to 30% in 1980 and 38% in 2000. Residuals should represent 13% and 17% of hardwood fiber in pulp in 1980 and 2000 respectively. After subtracting residuals, net fiber log demand is projected to increase from 56.9 million cbm in 1980 to 109 million cbm in 2000, a growth rate of 3.3%.

3.2.2.2 SUPPLY OUTLOOK

The United States supply of hardwood logs is projected to increase from 87.9 million cbm in 1980 to 141.7 million cbm in 2000, an increase of 61%. Residuals are expected to add 8.7 million cbm to supply in 1980 and 13.4 million cbm in 2000. Residuals, then, would account for 9% of the hardwood supply during the forecast period, up from 4% in 1960.

Economically available timber is expected to exceed industrial removals in both eastern regions through the year 2000. Annual growth historically has substantially exceeded removals for industrial products - by a factor of 3 to 4 times in the North and 2 to 3 times in the South. Based on the projected 2.4% annual growth in industrial hardwood demand, the growth to removal ratio should decline. Nonetheless, fully adequate supplies should exist throughout the forecast period. The South, which historically has accounted for 50% to 55% of hardwood industrial removals is expected to increase its share to 61% in 1980 and 66% in 2000.

TABLE 3.0.1.1

NORTH AMERICA

ESTIMATED DEMAND ON THE FOREST FOR INDUSTRIAL SOFTWOOD

(Millions of Cubic Meters)

Sawlog Demand	1960	1970	1980	1990	2000
Sawnwood & Sleepers					
Product Volume	63.6	72.7	84.4	90.8	95.0
Residuals Created	89.4	103.6	123.0	134.2	141.1
Gross Wood-in-the-Rough	153.0	176.3	207.4	224.9	236.1
Solidwood Panels					
Product Volume	8.3	15.3	19.8	23.9	25.9
Residuals Created	9.6	17.7	23.0	28.0	30.6
Gross Wood-in-the-Rough	17.9	33.0	42.8	51.9	56.5
Dom. Sawlog Demand	170.8	209.3	250.2	276.8	292.6
Sawlog Trade-Exp(Imp)	2.2	11.4	12.3	13.8	9.9
Total Sawlog Demand	173.0	220.7	262.5	290.6	302.5
Fiberlog Demand					
Reconstituted Panels	5.5	12.9	20.8	25.2	27.8
Other Ind. Roundwood	10.8	8.4	8.8	8.9	8.9
Pulp	107.7	175.3	191.9	221.2	265.9
Subtotal Demand	124.0	196.6	221.5	255.3	302.6
Less: Residuals Reused Domestically*	21.0	56.6	85.9	101.3	121.4
Net Dom. Fiberlog Demand	103.0	140.0	135.6	154.0	181.2
Fiberlog Trade-Exp(Imp)	0.5	1.4	-	-	-
Total Fiberlog Demand	103.5	141.4	135.6	154.0	181.2
TOTAL DEMAND FOR INDUSTRIAL SOFTWOODS	276.5	362.1	398.1	444.6	483.7

*Residuals Reused	21.0	61.1	99.5	114.6	121.4
of which exports	-	(4.5)	(13.6)	(13.3)	-
Residuals Reused Domestically	21.0	56.6	85.9	101.3	121.4

TABLE 3.0.2.1

NORTH AMERICA

ESTIMATED DEMAND ON THE FOREST FOR INDUSTRIAL HARDWOOD

(Millions of Cubic Meters)

Sawlog Demand	1960	1970	1980	1990	2000
Sawnwood & Sleepers					
Product Volume	12.2	14.5	13.5	14.2	14.6
Residuals Created	16.7	19.9	18.6	19.7	20.4
Gross Wood-in-the-Rough	28.9	34.4	32.1	33.9	35.0
Solidwood Panels					
Product Volume	0.9	1.6	1.7	1.8	1.9
Residuals Created	1.0	1.9	2.0	2.2	2.3
Gross Wood-in-the-Rough	1.9	3.5	3.7	4.0	4.2
Dom. Sawlog	30.8	37.9	35.8	37.9	39.2
Sawlog Trade-Exp(Imp)	-	-	-	-	-
Total Sawlog Demand	30.8	37.9	35.8	37.9	39.2
Fiberlog Demand					
Reconstituted Panels	3.5	5.9	8.5	11.7	15.4
Other Ind. Roundwood	9.7	6.3	6.3	6.4	6.5
Pulp	18.5	40.1	59.5	81.5	113.2
Subtotal Demand	31.7	52.3	74.3	99.6	135.1
Less: Residuals Reused Domestically	2.6	7.4	10.3	14.2	15.6
Net Dom. Fiberlog Demand	29.1	44.9	64.0	85.4	119.5
Fiberlog Trade-Exp(Imp)	-	-	-	-	-
Total Fiberlog Demand	29.1	44.9	64.0	85.4	119.5
TOTAL DEMAND FOR INDUSTRIAL HARDWOODS	59.9	82.8	99.8	123.3	158.7

TABLE 3.0.1.2

NORTH AMERICA

ESTIMATED SUPPLY AND SELF-SUFFICIENCY TRENDS FOR INDUSTRIAL ROUNDWOOD

(Millions of Cubic Meters)

Softwoods	1960	1970	1980	1990	2000
Sawlogs					
Domestic Supply	173.0	220.7	262.5	290.6	302.5
Net Imports (Exports)	(2.2)	(11.4)	(12.3)	(13.8)	(9.9)
Sawlogs Consumed	170.8	209.3	250.2	276.8	292.6
Residuals Reused					
Domestic Supply	21.0	61.1	99.5	114.6	121.4
Net Imports (Exports)	-	(4.5)	(13.6)	(13.3)	-
Residuals Supplied	21.0	56.6	85.9	101.3	121.4
Fiber Logs					
Domestic Supply	103.5	141.4	135.6	154.0	181.2
Net Imports (Exports)	(0.5)	(1.4)	-	-	-
Fiber Logs Consumed	103.0	140.0	135.6	154.0	181.2
Softwood Logs Supplied	276.5	362.1	398.1	444.6	483.7
FAO Report Basis		353.2			
Hardwoods					
Sawlogs					
Domestic Supply	30.8	37.9	35.8	37.9	39.2
Net Imports (Exports)	-	-	-	-	-
Sawlogs Consumed	30.8	37.9	35.8	37.9	39.2
Residuals Reused					
Domestic Supply	2.6	7.4	10.3	14.2	15.6
Net Imports (Exports)	-	-	-	-	-
Residuals Supplied	2.6	7.4	10.3	14.2	15.6
Fiber Logs					
Domestic Supply	29.1	44.9	64.0	85.4	119.5
Net Imports (Exports)	-	-	-	-	-
Fiber Logs Consumed	29.1	44.9	64.0	85.4	119.5
Hardwood Logs Supplied	59.9	82.8	99.8	123.3	158.7
FAO Report Basis		78.0			
TOTAL LOGS SUPPLIED	336.4	444.9	497.9	567.9	642.4

TABLE 3.1.1.1

CANADA

ESTIMATED DEMAND ON THE FOREST FOR INDUSTRIAL SOFTWOOD

(Millions of Cubic Meters)

Sawlog Demand	1960	1970	1980	1990	2000
Sawnwood & Sleepers					
Product Volume	13.2	19.9	30.5	36.9	40.2
Residuals Created	21.0	31.8	48.8	59.1	64.4
Gross Wood-in-the-Rough	34.2	51.7	79.3	95.9	104.6
Solidwood Panels					
Product Volume	0.8	1.8	2.3	3.0	3.8
Residuals Created	1.1	2.3	3.0	3.9	4.9
Gross Wood-in-the-Rough	1.9	4.1	5.3	6.9	8.7
Dom. Sawlog Demand	36.1	55.8	84.6	102.8	113.3
Sawlog Trade-Exp(Imp)	0.5	1.0	0.8	0.9	1.0
Total Sawlog Demand	36.6	56.8	85.4	103.7	114.3
Fiberlog Demand					
Reconstituted Panels	0.5	1.0	1.6	2.3	3.0
Other Ind. Roundwood	1.5	1.3	1.4	1.4	1.4
Pulp	38.5	65.0	69.5	81.0	98.3
Subtotal Demand	40.5	67.3	72.5	84.7	102.7
Less: Residuals Reused Domestically*	3.9	16.8	27.0	34.0	50.2
Net Dom. Fiberlog Demand	36.6	50.5	45.5	50.7	52.5
Fiberlog Trade-Exp(Imp)	2.2	2.3	-	-	-
Total Fiberlog Demand	38.8	52.8	45.5	50.7	52.5
TOTAL DEMAND FOR INDUSTRIAL SOFTWOODS	75.4	109.6	130.9	154.4	166.8

*Residuals Reused	4.7	17.8	36.8	45.7	50.2
Less: Exports	0.8	1.0	9.8	11.7	-
Residuals Reused Domestically	3.9	16.8	27.0	34.0	50.2

TABLE 3.1.2.1

CANADA

ESTIMATED DEMAND ON THE FOREST FOR INDUSTRIAL HARDWOOD

(Millions of Cubic Meters)

Sawlog Demand	1960	1970	1980	1990	2000
Sawnwood & Sleepers					
Product Volume	0.8	0.8	1.2	1.4	1.6
Residuals Created	1.4	1.5	2.0	2.4	2.8
Gross Wood-in-the-Rough	2.2	2.3	3.2	3.8	4.4
Solidwood Panels					
Product Volume	0.2	0.5	0.7	0.8	0.9
Residuals Created	0.2	0.6	0.9	1.1	1.2
Gross Wood-in-the-Rough	0.4	1.1	1.6	1.9	2.1
Dom. Sawlog	2.6	3.4	4.8	5.7	6.5
Sawlog Trade-Exp(Imp)	-	-	-	-	-
Total Sawlog Demand	2.6	3.4	4.8	5.7	6.5
Fiberlog Demand					
Reconstituted Panels	0.4	0.9	1.6	2.6	3.4
Other Ind. Roundwood	-	-	-	-	-
Pulp	1.6	4.4	7.1	8.2	9.3
Subtotal Demand	2.0	5.3	8.7	10.8	12.7
Less: Residuals Reused Domestically	0.2	1.1	1.6	1.9	2.2
Net Dom. Fiberlog Demand	1.8	4.2	7.1	8.9	10.5
Fiberlog Trade-Exp(Imp)	-	-	-	-	-
Total Fiberlog Demand	1.8	4.2	7.1	8.9	10.5
TOTAL DEMAND FOR INDUSTRIAL HARDWOODS	4.4	7.6	11.9	14.6	17.0

TABLE 3.1.1.2

CANADA

ESTIMATED SUPPLY AND SELF-SUFFICIENCY TRENDS FOR INDUSTRIAL ROUNDWOOD

(Millions of Cubic Meters)

Softwoods	1960	1970	1980	1990	2000
Sawlogs					
Domestic Supply	36.6	56.8	85.4	103.7	114.3
Net Imports (Exports)	(0.5)	(1.0)	(0.8)	(0.9)	(1.0)
Sawlogs Consumed	36.1	55.8	84.6	102.8	113.3
Residuals Reused					
Domestic Supply	4.7	17.8	36.8	45.7	50.2
Net Imports (Exports)	(0.8)	(1.0)	(9.8)	(11.7)	-
Residuals Supplied	3.9	16.8	27.0	34.0	50.2
Fiber Logs					
Domestic Supply	38.8	52.8	45.5	50.7	52.5
Net Imports (Exports)	(2.2)	(2.3)	-	-	-
Fiber Logs Consumed	36.6	50.5	45.5	50.7	52.5
Softwood Logs Supplied	75.4	109.6	130.9	154.4	166.8
FAO Report Basis		109.1			
Hardwoods					
Sawlogs					
Domestic Supply	2.6	3.4	4.8	5.7	6.5
Net Imports (Exports)	-	-	-	-	-
Sawlogs Consumed	2.6	3.4	4.8	5.7	6.5
Residuals Reused					
Domestic Supply	0.2	1.1	1.6	1.9	2.2
Net Imports (Exports)	-	-	-	-	-
Residuals Supplied	0.2	1.1	1.6	1.9	2.2
Fiber Logs					
Domestic Supply	1.8	4.2	7.1	8.9	10.5
Net Imports (Exports)	-	-	-	-	-
Fiber Logs Consumed	1.8	4.2	7.1	8.9	10.5
Hardwood Logs Supplied	4.4	7.6	11.9	14.6	17.0
FAO Report Basis		7.8			
TOTAL LOGS SUPPLIED	79.8	117.1	142.8	169.0	183.8

TABLE 3.2.1.1

UNITED STATES

ESTIMATED DEMAND ON THE FOREST FOR INDUSTRIAL SOFTWOOD

(Millions of Cubic Meters)

Sawlog Demand	1960	1970	1980	1990	2000
Sawnwood & Sleepers					
Product Volume	50.4	52.8	53.9	53.9	54.8
Residuals Created	68.4	71.8	74.2	75.1	76.7
Gross Wood-in-the-Rough	118.8	124.6	128.1	129.0	131.5
Solidwood Panels					
Product Volume	7.5	13.5	17.5	20.9	22.1
Residuals Created	8.4	15.4	20.0	24.1	25.7
Gross Wood-in-the-Rough	15.9	28.9	37.5	45.0	47.8
Dom. Sawlog Demand	134.7	153.5	165.6	174.0	179.3
Sawlog Trade-Exp(Imp)	1.7	10.4	11.5	12.9	8.9
Total Sawlog Demand	136.4	163.9	177.1	186.9	188.2
Fiberlog Demand					
Reconstituted Panels	5.0	11.9	19.2	22.9	24.8
Other Ind. Roundwood	9.3	7.1	7.4	7.5	7.5
Pulp	69.2	110.3	122.4	140.2	167.6
Subtotal Demand	83.5	129.3	149.0	170.6	199.9
Less: Residuals Reused Domestically*	17.1	39.8	58.9	67.3	71.2
Net Dom. Fiberlog Demand	66.4	89.5	90.1	103.3	128.7
Fiberlog Trade-Exp(Imp)	(1.7)	(0.9)	-	-	-
Total Fiberlog Demand	64.7	88.6	90.1	103.3	128.7
TOTAL DEMAND FOR INDUSTRIAL SOFTWOODS	201.1	252.5	267.2	290.2	316.9

	1960	1970	1980	1990	2000
*Residuals Reused	16.3	43.3	62.7	68.9	71.2
Less: Exports	(0.8)	3.5	3.8	1.6	-
Residuals Reused Domestically	17.1	39.8	58.9	67.3	71.2

TABLE 3.2.2.1

UNITED STATES

ESTIMATED DEMAND ON THE FOREST FOR INDUSTRIAL HARDWOOD

(Millions of Cubic Meters)

Sawlog Demand	1960	1970	1980	1990	2000
Sawnwood & Sleepers					
Product Volume	11.4	13.7	12.3	12.8	13.0
Residuals Created	15.3	18.4	16.6	17.3	17.6
Gross Wood-in-the-Rough	26.7	32.1	28.9	30.1	30.6
Solidwood Panels					
Product Volume	0.7	1.1	1.0	1.0	1.0
Residuals Created	0.8	1.3	1.1	1.1	1.1
Gross Wood-in-the-Rough	1.5	2.4	2.1	2.1	2.1
Dom. Sawlog	28.2	34.5	31.0	32.2	32.7
Sawlog Trade-Exp(Imp)	-	-	-	-	-
Total Sawlog Demand	28.2	34.5	31.0	32.2	32.7
Fiberlog Demand					
Reconstituted Panels	3.1	5.0	6.9	9.1	12.0
Other Ind. Roundwood	9.7	6.3	6.3	6.4	6.5
Pulp	16.9	35.7	52.4	73.3	103.9
Subtotal Demand	29.7	47.0	65.6	88.8	122.4
Less: Residuals Reused Domestically	2.4	6.3	8.7	12.3	13.4
Net Dom. Fiberlog Demand	27.3	40.7	56.9	76.5	109.0
Fiberlog Trade-Exp(Imp)	-	-	-	-	-
Total Fiberlog Demand	27.3	40.7	56.9	76.5	109.0
TOTAL DEMAND FOR INDUSTRIAL HARDWOODS	55.5	75.2	87.9	108.7	141.7

TABLE 3.2.1.2
UNITED STATES
ESTIMATED SUPPLY AND SELF-SUFFICIENCY TRENDS FOR INDUSTRIAL ROUNDWOOD

(Millions of Cubic Meters)

Softwoods	1960	1970	1980	1990	2000
Sawlogs					
Domestic Supply	136.4	163.9	177.1	186.9	188.2
Net Imports (Exports)	(1.7)	(10.4)	(11.5)	(12.9)	(8.9)
Sawlogs Consumed	134.7	153.5	165.6	174.0	179.3
Residuals Reused					
Domestic Supply	16.3	43.3	62.7	68.9	71.2
Net Imports (Exports)	0.8	(3.5)	(3.8)	(1.6)	-
Residuals Supplied	17.1	39.8	58.9	67.3	71.2
Fiber Logs					
Domestic Supply	64.7	88.6	90.1	103.3	128.7
Net Imports (Exports)	1.7	0.9	-	-	-
Fiber Logs Consumed	66.4	89.5	90.1	103.3	128.7
Softwood Logs Supplied	201.1	252.5	267.2	290.2	316.9
FAO Report Basis		244.1			
Hardwoods					
Sawlogs					
Domestic Supply	28.2	34.5	31.0	32.2	32.7
Net Imports (Exports)	-	-	-	-	-
Sawlogs Consumed	28.2	34.5	31.0	32.2	32.7
Residuals Reused					
Domestic Supply	2.4	6.3	8.7	12.3	13.4
Net Imports (Exports)	-	-	-	-	-
Residuals Supplied	2.4	6.3	8.7	12.3	13.4
Fiber Logs					
Domestic Supply	27.3	40.7	56.9	76.5	109.0
Net Imports (Exports)	-	-	-	-	-
Fiber Logs Consumed	27.3	40.7	56.9	76.5	109.0
Hardwood Logs Supplied	55.5	75.2	87.9	108.7	141.7
FAO Report Basis		70.2			
TOTAL LOGS SUPPLIED	256.6	327.7	355.1	398.9	458.6

WESTERN EUROPE

4.0 WESTERN EUROPE

The outlook presented for Western Europe in this report is considered by the Working Party to reasonably represent the forces affecting the region's potential demand, consumption and trade by product type and fiber category. Within Western Europe, however, it is more difficult to accurately identify the specific sub-regions which will have excess capacity for specific products and from which net exports will occur. The potential for extensive trade flows fostered by the European Common Market makes it particularly difficult to identify the countries which will have deficits or surpluses in particular products. The Working Party has completed two "iterations" in which it has attempted to assign productive capacity to countries within the region based on their perceived demand and supply forces. Nonetheless, there are still some further specific adjustments which the Working Party would undoubtedly make were it able to complete further iterations.

As noted in section 1.5, the Working Party's method of dealing with potential supply deficits or surpluses is to force a balance in the net trade column. Those projected physical flows which appear particularly unlikely have been designated with an asterisk and discussed in the text. Where such small surpluses or shortages do appear for one of the sub-regions, the Working Party suggests that the reader check Western Europe's total outlook to be assured that from a regional point of view they are of little consequence.

4.0.1 DEMAND OUTLOOK

Consumption of industrial roundwood (including roundwood imports) in Western Europe is expected to rise from 262.2 million cbm in 1980 to 342.5 million cbm in 2000. This represents an annualized increase of 1.3%, down sharply from the 2.5% growth estimated for the 1960-80 period. Sawlogs are expected to continue losing share to fiber logs. Compared with 56% of logs consumed in 1960, they are expected to fall to 48% and 42% in 1980 and 2000 respectively. Mill residuals should continue supplying about 20% of the region's requirements for fiber log type material.

Western Europe's mix of softwoods and hardwoods is expected to gradually shift toward more hardwoods consumed. Compared with 26.0% of logs consumed in 1960, hardwoods are expected to represent 28.4% and 29.5% in 1980 and 2000 respectively. Sawlogs should maintain a relatively stable relationship throughout the forecast period with hardwood sawlogs consumed falling slightly from 25.4% in 1960 to 24.2% by 2000. Hardwood fiber logs, however, are expected to gain share strongly, rising from an estimated 26.7% in 1960 to 33.5% by 2000.

4.0.2 SUPPLY OUTLOOK[1]

In the year 2000, the area of forest and other wooded land in Western Europe is expected to be 153 million hectares. This is almost exactly one-third of the land area of the region. Compared with 1970, the area covered by some kind of tree cover should be 6 million hectares or 4% more in 2000. The area of exploitable forest in the year 2000, at 124.6 million hectares is expected to rise proportionately more, by nearly 12 million hectares or 10%. This expected result should arise partly from the conversion of low quality wooded areas into productive forest, and partly from the afforestation of non-forest, chiefly marginal agricultural, land.

The volume of growing stock in Western Europe in 2000 is estimated at 11.6 thousand million cbm o.b. (overbark) or 8-1/2% more than in 1970. The average growing stock per hectare of exploitable forest will thus remain virtually unchanged at 93 cbm o.b. per hectare. The annual increment and drain are estimated as follows:

	(million cbm) 1970	 2000
Gross annual increment (o.b.)	369	436
Natural losses (o.b.)	22	21
Net annual increment (o.b.)	347	415
Bark on net annual increment	45	54
Net annual increment (u.b.-underbark)	302	361
Estimated fellings (u.b.)	289	354-387
Felling losses (u.b.)	26	30-33
Roundwood removals (u.b.)	263	324-354
- Softwood	171	218-240
- Hardwood	92	106-114

The removals forecast and supply narrative for this report has principally been prepared by the Timber Section of ECE/FAO's Agricultural and Timber Division. To obtain forecasts of removals for use in the present study, countries' experts who had assisted the FAO/ECE secretariat in the preparation of European Timber Trends and Prospects, 1950 to 2000 (ETTS III) were invited to revise their original forecasts given in 1975. Besides a basic forecast, the experts were asked to provide estimates of "potential maximum removals" in 1980, 1990 and 2000, and to indicate the conditions under which the higher level could be attained. Since this was an unofficial exercise,

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[1] Apart from the removals forecasts, the data and estimates in this section are based on (ETTS III) European Timber Trends and Prospects, 1950 to 2000 (Supplement 3 to Volume XXIX of the FAO/ECE Timber Bulletin for Europe.

the correspondents were encouraged to express their own personal views about their earlier submissions for ETTS III.

Replies were received from countries accounting for as much as 99% of Western Europe's removals in the mid-1970's, although not all replies were able to give forecasts in the detail asked for, for example, the breakdown into coniferous and broadleaved industrial wood and fuelwood. In such instances, for 2000 the Working Party has filled the gaps using as far as possible ETTS III figures. To match perceived demand with potential supply, the Working Party has typically increased trade rather than adjust the harvest. In cases where there have been minor adjustments to the harvest, the Working Party believes them to be well within the margin for error in estimating potential supply.

The aggregate for Western Europe of countries revised (1978) forecasts of removals in 2000 is 324 million cbm. The harvest adopted by the Working Party which is shown on Table 4.0.1.2 is 326 million cbm. These estimates are not significantly different from the ETTS III basic forecast of 319 million cbm for Western Europe. Thus, compared with the mid-1970's, the range of removals forecasts furnished to the Working Party is 76 million cbm to 105 million cbm or 31% to 43% higher. It has to be borne in mind, however, that the level of removals in the mid-1970's had fallen below the long-term trend line as a result of the general economic recession in the region and were even 15 million cbm less than at the beginning of the decade.

The reader's attention is also drawn to the 1970 calculations of theoretical log production shown on Table 4.0.1.2. The Working Party's estimates of the necessary log supply to meet Western Europe's fiber needs in 1970 are high by 9.6 million cbm. Considering the difficulty in estimating product yields, residual recovery and trade, this 4.5% difference is relatively modest. It implies, however, that future supply requirements could also be somewhat overstated if the FAO log production and trade numbers are correct. Considering that Western Europe's annual growth in log consumption during the 1990-2000 period is estimated at 1.4%, should this 4.5% truly reflect a lower demand, its effective impact merely to forestall the consumption pressures identified by three to four years.

After adding an estimated volume of felling and removal losses to the above removals forecasts, total fellings in 2000 are predicted to be of the order of 354 million cbm to 381 million cbm. The higher forecast of fellings exceeds the ETTS III estimate of net increment in 2000 by 26 million cbm or 7%, which could suggest overcutting leading to a decline in the volume of growing stock. The Working Party is of the opinion, however, that the historical tendency for increment in Europe's forests to be underestimated is still in evidence. Given the growing conditions and level of management in the region, the average increment of 3.3 cbm per hectare per year or 3.6% of the growing stock predicted for the year 2000 could prove to be too low. Furthermore, given a stimulus from expanded demand, there is considerable potential for raising increment rates even by the year 2000 by more intensive management practices.

4.0.1 OUTLOOK FOR SOFTWOODS

4.0.1.1 DEMAND OUTLOOK

Consumption of softwood logs in Western Europe (including imports) is projected to increase from 187.7 million cbm in 1980 to 241.5 million cbm in 2000. This 1.3% annualized growth rate is down sharply from 2.3% rate estimated for the 1960-80 period. Sawlogs are expected to continue losing share to fiber logs during the forecast period. Compared with 57% in 1960, their share is extimated at 51% and 46% in 1980 and 2000 respectively. Of the region's total pulpwood consumption, residuals are expected to remain in the 24% to 25% range.

4.0.1.2 SUPPLY OUTLOOK

In the year 2000, softwoods should roughly represent two thirds of Western Europe's growing stock, increment and removal In all cases the proportion should be slightly higher than in 1970, reflecting the emphasis in most countries' forest policies to promoting softwoods. Removals of softwood have been estimated by the reporting countries to reach 218 to 240 million cbm in 2000. This equals an increase of 27% to 40% on the mid-1970's volume. The countries' correspondents have estimated that industrial wood should account for 202-224 million cbm and fuelwood 16 million cbm.

With regard to fuelwood, this estimate for 2000 has changed little from the level recorded during the 1970's, suggesting that the previous steep decline in softwood fuelwood use may level out at current levels. The Working Party has questioned this assumption and effectively adopted a lower fuelwood consumption estimate. Thus the 232 million cbm forecast for 2000 is comprised of 224 million cbm upper limit for industrial wood removals plus about 8 million cbm transferred from the fuelwood sector. As noted above, however, "potential maximum removals" exceed this 224 million cbm estimate by 30 million cbm, so that some further supply could be generated to cover a higher fuelwood estimate.

The forecast of 240 million cbm infers an annual rate of removals of 3.5% of the growing stock volume, estimated in ETTS III at 7.72 billion cbm o.b. (after adjusting the former figure to overbark measure). Adding felling losses, total softwood fellings would be of the order of 262 million cbm which compares with the ETTS III estimate of net annual increment of about 245 million cbm. As already mentioned, the Working Party considered that the latter figure is subject to upward revision, but nonetheless it does appear that in Western Europe as a whole, softwood removals may be approaching the level of potential cut by the year 2000. In other words, the slight "slack" between growth and drain which still existed in the 1970's may be removed during the next two decades.

Table 4.0.1.2 also shows that net softwood log imports should rise from an estimated 5.6 million cbm in 1980 to 9.3 million cbm by 2000. Self-sufficiency should thus decline from about 97% to 96% during the next two decades. This growth of net imports is expected to be exclusively in sawlogs which are projected to rise from 1.5 million cbm to 6.1 million cbm between 1980 and 2000. This rise to 6.1 million cbm could easily, however, overstate what imports will occur if for economic or political reasons the Soviet Union provides inadequate softwood sawlogs to support the expected growth of Nordic and West German sawnwood production. Without these logs or a markedly improved yield of sawnwood per unit of log sawn or the use of smaller logs, the region's potential sawlog supply is perceived too small to meet the production estimated in Phase IV. Pulpwood imports are expected to stabilize in the rage of 5.0 million cbm. Softwood imports should decline by the early 1980's as their cost becomes increasingly unattractive due to high transport costs and competition from Japan for supplies. Hardwood pulpwood imports are shown to increase to meet the perceived shortage in other EEC countries, primarily Italy. As noted in section 4.4.2 about this sub-region, however, the fiber consumption and domestic supply may well be misestimated for a variety of reasons.

4.0.2 OUTLOOK FOR HARDWOODS

4.0.2.1 DEMAND OUTLOOK

Western Europe's consumption of hardwood logs is expected to increase from 74.5 million cbm in 1980 to 101.0 million cbm in 2000. The bulk of this forecast growth is projected to be in fiber logs. Compared with their estimated physical growth of 22.3 million cbm during that period, consumption of hardwood sawlogs is expected to grow by only 4.2 million cbm, while consumption of hardwood fiber logs grows by 21.6 million cbm. Thus by year 2000, hardwood fiber logs are expected to represent 65% of the hardwood logs consumed, up markedly from the 45% and 58% estimates for 1960 and 1980 respectively. Mill residuals are expected slightly to lose share of total pulpwood, declining from an estimated 13% in 1980 to 12% by 2000.

4.0.2.2 SUPPLY OUTLOOK

The one-third share which hardwoods represent of Western Europe's growing stock, increment and removals has been declining and is expected to decline still further. This decline partly reflects the deliberate policy in many countries to favor softwoods in afforestation and reforestation and, in the case of removals, an increasing shortfall in demand for the lower qualities relative to physical availability.

Western Europe's removals of hardwoods in the year 2000 have been estimated by the countries' correspondents at 106-114 million cbm. This is 30-38 million cbm or 39% to 50% more than the region produced in the mid-1970's. Of this total, 70-88 million cbm is expected to be industrial wood, the remainder fuelwood. Countries' estimates infer a level of fuelwood removals only 2-4 million cbm less than the 30 million cbm of the mid-1970's. As with softwood fuelwood, the Working Party expects that the rate of decline in fuelwood consumption will be steeper than this, even if not as rapid as in the previous quarter century. Accordingly, it has assumed that at least 6 million of the potential 26-28 million cbm is available for industrial applications. Taking again the projected upper limit of supply, this should provide the 94 million cbm shown on Table 4.0.1.2. Accordingly the Working Party's removals forecast for hardwoods in 2000 is 115 million cbm of which 94 million cbm is expected to be industrial wood.

Adding felling losses to removals, Western Europe's hardwood cut in 2000 is estimated at 125 million cbm, which compares with the ETTS III estimate of net annual increment of 116 million cbm. For the same reasons as put forward above for softwood, the increment figure is probably an under-estimate, but the possibility of the hardwood cut also approaching the level of net growth by the end of the century deserves further examination. At the present time, and certainly for some time to come, however, the problem will remain one of oversupply and accumulation of standing hardwood timber in the forest.

The overbark volume of removals forecast for 2000 corresponds to about 3.2% of the estimated hardwood growing stock of 3.89 billion cbm in Western Europe.

As Table 4.0.1.2 shows, Western Europe is expected to need 5.2 million cbm of imported hardwood sawlogs to produce the Phase IV volume of sawnwood and plywood. The problem is particularly acute in the Nordic countries where massive hardwood imports will be needed if the Phase IV production levels are to be achieved. Because that region's birch sawlogs are rapidly being exhausted, the industry which they supported will need an alternative supply to survive. The Working Party has shown this region to be a growing importer of hardwood sawlogs in the 1980-2000 period, although it seems highly probable that hardwood sawnwood will shift to another location and to some extent that birch-faced softwood plywood will substitute for the all-birch product.

4.1 FRANCE

In terms of area of exploitable forest, volume of growing stock, increment and removals, France stands in third position in Western Europe after Sweden and Finland. For hardwood species alone, however, it is the leading country of the region.

A forecast made in the Spring of 1978 gives a volume of roundwood removals in 2000 of 38.5 million cbm, compared with 29 million cbm in the mid-1970's. The former figure is nearly 8 million cbm less than the estimate of 47 million cbm given in ETTS III, which is now considered to represent a potential maximum level. The Working Party has, however, agreed on a total removals volume of 43 million cbm. While well below what it believes to be the potential cut in France, it considers this volume realistic in relation to foreseeable demand. It infers an appreciable undercutting of hardwoods.

There are considerable problems to be overcome in order to raise productivity and removals even by the 44% forecast over 25 years. Not least amongst these is the ownership structure. Nearly three quarters of the French forest is privately owned. Out of a total of 2.2 million holdings on 13.4 million hectares of forest land, 2 million occupy less than 10 hectares each.

4.1.1 OUTLOOK FOR SOFTWOODS

4.1.1.1 DEMAND OUTLOOK

Consumption of softwood logs in France is expected to grow from 15.4 to 20.7 million cbm between 1980 and 2000. The bulk of this 1.5% annualized growth is projected for fiber logs. They should represent about 4.4 million cbm of the projected 5.3 million cbm increase. Mill residuals should represent about 21% of France's softwood pulpwood supply by 2000, reducing the demand for fiber logs by an estimated 2.9 million cbm at that time.

4.1.1.2 SUPPLY OUTLOOK

From 13.6 million cbm in the mid-1970's, softwood removals in France are estimated to reach 19.8 million cbm by 2000. Of the latter volume, all but a small quantity should consist of industrial wood. The increased domestic supply, however, is estimated to consist wholly of fiber logs with no potential for a further increase in domestic sawlog supplies. Phase IV, however, has projected a minor increase in production which is coupled in Phase V with a projected deterioration in product yields due to declining log diameter and quality. Accordingly, France is expected to be a net importer of coniferous raw material up to a total of 1.2 million cbm, primarily sawlogs. Total softwood industrial wood raw material supply is estimated at 20.7 million cbm in the year 2000 for a self-sufficiency ratio of 94%. Mill residuals are expected to be near their practical maximum with 69% of all residuals produced being recycled for industrial products.

4.1.2 OUTLOOK FOR HARDWOODS

4.1.2.1 DEMAND OUTLOOK

Consumption of hardwood logs in France is expected to grow modestly in the 1980-2000 period. Table 4.1.2.1 shows that the consumption of sawlogs is expected to rise only minimally, up 0.9% annually from 8.9 million cbm in 1980 to 10.6 million cbm in 2000. Fiber log consumption is expected to grow more rapidly, roughly doubling from 5.2 million cbm in 1980 to 10.6 million in 2000. Mill residuals should again contribute significantly to France's pulpwood supply representing about 18% of the country's hardwood pulpwood consumption by 2000.

4.1.2.2 SUPPLY OUTLOOK

Hardwood removals in France are estimated to increase from 15.4 million cbm in the mid-1970's to 22.9 million cbm in 2000. After deducting an estimated 1.0 million cbm for fuelwood, domestic supply of industrial hardwoods should be about 21.9 million cbm. As noted earlier, the hardwood cut, including bark and felling losses, may still fall somewhat short of potential cut, unless markets, additional to those foreseen by the Working Party, are created. This problem is associated with the still extensive areas of coppice and other lower quality hardwood stands, where the economics of harvesting remains a serious problem.

From being a moderate net importer of hardwood roundwood, France is expected to be a minor net exporter by the year 2000. Imports of tropical hardwood logs are expected to decline as other countries bid aggressively for supplies while France generates enough fiber to expand its production somewhat via increased domestic removals. A small export volume of hardwood pulpwood has been postulated to meet the needs of producers in other EEC countries but the development of such a flow is by no means certain. Total supply of hardwood industrial wood raw material in France in 2000 is, therefore, estimated at 21.2 million cbm for a self-sufficiency level of about 103%.

4.2 WEST GERMANY

West Germany stands eighth in Western Europe in terms of exploitable forest area, but fourth after Sweden, Finland and France in terms of growing stock, increment and removals. Its growing stock and increment per hectare are considerably above the Western European average. Nevertheless, because of its heavy population density, it is a large net importer of forest products and is expected to remain so.

The latest estimate for removals from Germany is 33 million cbm in the year 2000 with a potential maximum of 38 million cbm. These compare with 29 million cbm in the mid-1970's. The Working Party has accepted the higher estimate as its forecast and estimated a minimal consumption of fuelwood. The Working Party has adopted this relatively high outlook because recent reports on forest inventories currently show an appreciable degree of underestimation of growing stock and increment in previous inventories. Coupled with a strong demand outlook, the Working Party estimates that a higher level of supply may emerge than was previously calculated.

The structure of the German forest industry is complex. Fifty-six percent of the forest is publicly owned, with predominant control at the state level. Nevertheless, there are over 550,000 forest holdings in Germany, and amongst private owners, more than 96% have holdings of less than 20 hectares.

4.2.1 OUTLOOK FOR SOFTWOODS

4.2.1.1 DEMAND OUTLOOK

West Germany's consumption of softwood industrial roundwood is forecast to increase from 22.5 million cbm in 1980 to 29.0 million cbm in 2000. This represents an annualized consumption growth of 1.3% down from the 2.1% rate of the 1960-80 period. Fiber logs are expected to rapidly gain share of total logs consumed, rising from 37% in 1960 to 44% and 50% in 1980 and 2000 respectively. Mill residuals should account for more than a quarter of West Germany's softwood pulpwood consumed by 2000.

4.2.1.2 SUPPLY OUTLOOK

Softwoods make up more than 70% of Germany's growing stock, and are expected to increase their share slightly by 2000. Removals are estimated to increase from 20.9 million cbm in the mid-1970's to over 27 million cbm in 2000, of which only a marginal quantity will be fuelwood. From being a net exporter of coniferous raw material in the mid-1970's, partly due to exceptional circumstances connected with clearances of wind-blown timber, Germany is forecast to be a net importer of about 2.5 million cbm by 2000. If the present outlook for domestic production holds true, sawlogs will decline as a share of total domestic softwood roundwood supply from 68% in 1960 to 55% and 45% in 1980 and 2000. Concurrently, Germany's product yield will deteriorate somewhat due to changes in the raw material quality. Under such circumstances, Germany's need for imported softwood fiber will be exclusively in the form of sawlogs compared with the heavy predominance of chips in the 1960-70 period. Should the share of sawlogs remain near the 1970 level of 66%, however, pulpwood imports will be needed instead. Thus total softwood industrial roundwood supply is estimated to reach 29 million cbm in year 2000 for a self-sufficiency level of 91%.

4.2.2 OUTLOOK FOR HARDWOODS

4.2.2.1 DEMAND OUTLOOK

West Germany's consumption of hardwood industrial roundwood is expected to increase from 9.9 million cbm in 1980 to 11.6 million cbm by 2000. The bulk of this 1.7 million cbm is projected to be in pulpwood with sawlogs accounting for less than a third. Thus sawlogs are expected to lose share of total hardwood industrial roundwood consumed, declining from 53% in 1960 to an estimated 44% and 42% in 1980 and 2000 respectively. Mill residuals are expected to play a relatively minor role with their share in 2000 representing roughly 10% of pulpwood consumed.

4.2.2.2 SUPPLY OUTLOOK

Removals of hardwoods in West Germany are estimated to rise to 11.6 million cbm by 2000. Of these removals 10.6 million cbm are expected to be industrial wood, an increase of 28% over the peak supply level of 8.2 million cbm reached in the mid-1970's. The Working Party has added about 1.0 million cbm to the removals forecast for West Germany believing that strong demand pressures should expand its pulpwood supply and that its hardwood sawlog potential may be underestimated. This portion of the outlook is definitely speculative; should the supply not be forthcoming, however, the French surplus referred to in section 4.1.2.2 could offset any shortfall.

West Germany's net imports of hardwood logs are expected to fall in the 1980's. From earlier levels in the 1.6-1.7 million cbm range, sawlog imports are expected to drop to 0.9 million cbm in 1980 before climbing to the 1.4 million cbm range by 2000. The Working Party's Phase IV estimate for pulpwood consumption has not fully stretched Germany's potential supply in the 1980-2000 period. Consequently a slight net export of hardwood fiber logs in the range of 0.4-0.6 million cbm has been postulated, although the logistics of this supply to a deficit country might preclude its movement. The increase is likely to take the form of pulpwood. Total supply of hardwood industrial wood is forecast to amount to 10.6 million cbm in 2000 compared with 7.3 million cbm in the mid-1970's.

4.3 UNITED KINGDOM

The United Kingdom is a lightly forested country, with only 8% of its land area under tree cover. With a dense population it is, accordingly, heavily dependent on overseas supplies for its requirements of forest products, with over 90% of its consumption coming from imports. Over the past half century it has undertaken an active afforestation and reforestation program, principally in softwoods, the fruits of which, in terms of wood production, will become increasingly apparent from the 1990's onwards. Nevertheless, domestic supply of wood estimated at 7.8 million cbm in the year 2000 compared with 3.3 million cbm in the mid-1970's, will still cover only a minor part of the country's needs.

4.3.1 OUTLOOK FOR SOFTWOODS

4.3.1.1 DEMAND OUTLOOK

Consumption of softwood logs in the United Kingdom is expected to grow rapidly in the next two decades albeit from a very small base. Compared with an estimated 2.0 million cbm in 1960, softwood log consumption is expected to increase to 2.8 million cbm in 1980 and then jump to 6.2 million cbm by 2000. Fiber logs are projected to return to their prior prominent position in the United Kingdom's softwood log consumption. After falling to about 50% in 1980 they are expected to reach 68% by 2000. Although mill residuals should be extensively reused, their low generation keeps their estimated share of softwood pulpwood below 20%.

4.3.1.2 SUPPLY OUTLOOK

The softwood growing stock and increment volumes in 2000 are estimated to be about 3 times higher than in 1970, with a corresponding rise in removals to 6.5 million cbm, virtually all of which will be industrial wood. As plantations grow towards maturity, an increasing proportion of the removals should be of sawlog size. The United Kingdom is expected to remain an importer of processed and semi-processed forest products, rather than the raw material. Accordingly, net imports of the latter should remain negligible. Total supply of softwood industrial wood raw material in 2000 is forecast to be 6.2 million cbm, compared with 2.2 million cbm in the mid-1970's.

4.3.2 OUTLOOK FOR HARDWOODS

4.3.2.1 DEMAND OUTLOOK

Consumption of hardwoods for the production of fibrous products in the United Kingdom is expected to be relatively stable throughout the 1980 to 2000 period. Table 4.3.2.1 shows that the consumption of hardwood sawlogs is expected to decline marginally during that period. Consumption of fiber logs should be unchanged.

4.3.2.2 SUPPLY OUTLOOK

Removals of hardwood in 2000 are expected to be about 1.4 million cbm. Industrial wood should constitute the bulk of this supply. Some planting of hardwoods has taken place and continues, but part of such work is for non-production purposes. Furthermore, rotation ages are generally up to twice the 40-70 years for softwoods.

The Working Party has estimated that physical supply of hardwoods could well exceed domestic consumption by 0.2-0.3 million cbm during the 1980-2000 period. In developing its production and self-sufficiency estimates for products in Phases II, III and IV, it did not anticipate that such a surplus, albeit small, might emerge. It is feasible but seems doubtful that this potential surplus, if available, might be transshipped to Scandinavia for processing. To balance the Western Europe account, however, the 1980-2000 trade of 0.3 million cbm has been postulated. Should this surplus not emerge, the difference can readily be offset by an accelerated cut in France.

4.4 OTHER EEC COUNTRIES

The countries concerned, Belgium, Denmark, Ireland, Italy, Luxembourg and the Netherlands, have one similarity - they are all wood-deficit countries. Otherwise, however, their forestry situations vary considerably from the Mediterranean conditions in Italy, with emphasis on the protective role of the forest, to the intensive forestry in Denmark and an active afforestation program in Ireland. Italy accounted for 354 million cbm or over two-thirds of the group's total growing stock in 1970. Because of the low productivity of many of its forests, however, its share of the group's removals was only 63% in 1970 and less by the mid-1970's. Despite an increase of 3.3 million cbm, Italy's share of regional supply should be little more than half the total by 2000. The other country which should contribute strongly to the growth in removals is Ireland, which is expected to increase its harvest from 0.3 million cbm in the mid-1970's to 2.7 million cbm in 2000. This projected growth in supply reflects the coming into production of Ireland's, by European standards, high-yielding softwood plantations. Italy and Ireland, between them should account for over 90% of the group's increase in removals which are estimated to rise from 12.3 million cbm in the mid-1970's to 19.4 million cbm by 2000.

4.4.1 OUTLOOK FOR SOFTWOODS

4.4.1.1 DEMAND OUTLOOK

Consumption of softwood industrial roundwood (including exports) is estimated to rise from 11.0 million cbm in 1980 to 12.7 million cbm by 2000. Virtually no change is expected in the sawlog sector which should hold 3.0-3.2 million cbm.

The principal growth which is projected for the region is in fiber logs which are projected to increase from 8.0 to 9.5 million cbm during that period. Mill residuals are expected to be a minor part of the region's pulpwood supply, representing roughly 10% during the forecast period.

4.4.1.2 SUPPLY OUTLOOK

Softwood industrial wood removals in the Other EEC group are forecast to reach 9.7 million cbm or rather more than twice the mid-1970's level. The largest increases will occur in Ireland (plus 2.3 million cbm) and Italy (plus 1.8 million cbm). This sub-region, which had net imports of coniferous raw material of 3 million cbm in the mid-1970's, should still be importing at least that quantity for the next two decades, primarily from the Soviet Union. Total supply of softwood industrial raw material is estimated for 2000 at 12.7 million cbm, compared with 7.5 million cbm in the mid-1970's. Softwood log self-sufficiency should be in the range of 76% at that time.

The Working Party notes that its estimate for domestic log supply in 1970 exceeds that of FAO by a significant margin. In order to produce the coniferous products such as panels and pulp which are estimated for 1970, the Working Party has had to postulate a higher level of pulpwood imports than the statistics show. Although some of this discrepancy could occur because of misestimation of the softwood/hardwood mix for such products, there is also a shortage of hardwood fiber. Other reasons for this difference could include misestimation of product conversion factors, understatement of residuals recycled, and misclassification of removals. Nonetheless, there still appears to be a significant inaccuracy in the statistics for this sub-region's fiber supply or production of fabricated products.

4.4.2 OUTLOOK FOR HARDWOODS

4.4.2.1 DEMAND OUTLOOK

Consumption of hardwood logs in the Other EEC Countries between 1980 and 2000 is expected to hold relatively steady, increasing only from 10.1 to 11.0 million cbm during that period. Sawlog consumption is actually projected to decline slightly from 4.8 to 4.5 million cbm. Fiber log consumption should increase somewhat, rising from 5.3 million cbm in 1980 to 6.5 million cbm by 2000. Residuals should represent less than 20% of the pulpwood type material throughout that period.

Hardwoods accounted for over 60% of the group's removals in the mid-1970's, but expansion of hardwood log supplies is expected to occur more slowly than for softwoods. Consequently the estimated hardwood removals of 9.6 million cbm in 2000 should barely constitute half of the total harvest. Domestic supply of industrial hardwood roundwood, however, should increase, partly due to a decline in fuelwood removals as potential fuelwood supplies are incorporated into the industrial wood supply, especially in Italy.

4.4.2.2 SUPPLY OUTLOOK

Regarding the relationship between logs supplied and products produced, the same problem exists for hardwoods as for softwoods. The Working Party is again concerned about the accuracy of the historical statistics, or else its estimate for fiber demand. It is satisfied that the hardwood sawlog outlook is possible, although it does seem likely that sawlog imports may continue as the domestic harvest grows despite the expected intense competition by other sub-regions for imported logs. Should this in fact occur, it would effectively make the other EEC countries less dependent upon imports to meet the finished product needs shown in Phase IV.

The estimated supply in 1970 of 4.6 million cbm of fiber logs has been created to provide adequate fiber for the products produced. The reported production is in the range of 2.0 million cbm only. Perhaps there was instead a major inflow of unreported pulpwood, but from where? In other words, the reported supply again seems grossly inadequate to produce the quantity of material reported.

To meet the expected fiber needs for this region, the Working Party has again postulated massive imports of pulpwood. The deficit could, of course, be filled by a higher domestic harvest but the country correspondents have not suggested that possibility.

4.5 NORDIC COUNTRIES

The Nordic countries hold a particularly important place in Western Europe's forest industry. With 45% of Western Europe's forest area and around two-fifths of its growing stock, increment and removals, the Nordic countries are, because of their sparce populations, the major suppliers of forest products to the rest of the region.

While their location within the northern coniferous belt means that the composition of their forests is similar, the forestry situation in the countries of the group, Finland, Norway and Sweden, shows some important differences from the point of view of future wood supply. For a period in the 1960's Finland's removals exceeded potential cut, as a result of which steps were taken to stimulate the long-term growth of wood supply and at the same time to ensure that the growth of industrial capacity matched raw material availability. Finland forecasts removals of 47 to 54 million cbm in 2000, an increase of 33-52% on the depressed level of the mid-1970's. In Norway the problem is mainly one of accessibility to many areas of forest which are overmature and need to be brought under proper management. Growth in removals will partly depend on the rate of road-building. The forecast for removals of 11.4 million cbm in 2000 is 20% higher than for the mid-1970's. In Sweden, rapid growth of industrial capacity led to removals exceeding potential cut by an appreciable margin in the early 1970's. Even though measures along the lines of those taken earlier in Finland were being introduced in Sweden, it was felt at the time that ETTS III was written (1975/76) that overcutting would inevitably continue in the latter to the end of the century, with some decline in growing stock as one result. The latest (1978) estimate of removals in 2000 of 62.5 million cbm is 2.5 million cbm less than the ETTS III estimate.

Of possible importance to the future trend of removals are the considerably lower quantities cut since 1974 than had earlier been foreseen as a result of the deep economic recession. This applies not only to Sweden and the other Nordic countries but to most countries in Western Europe. The additional quantities left to grow in the forest represent a form of reserve out of which to augment the level of future removals. The Working Party feels justified, therefore, in using the higher of this country group's estimates of removals in 2000 as the basis for its forecast. In doing so, it has also assumed that current research efforts in the Nordic countries into harvesting economically a larger part of the total biomass, including tops, branches and stumps will have a noticeable impact by 2000.

There is still a possibility that cut may exceed growth in Sweden and also in Finland if the above forecast is realized. The Working Party believes, however, that steps being taken in these countries to safeguard and improve their forest resource for the long-term could justify a temporary decline in growing stock.

4.5.1 OUTLOOK FOR SOFTWOODS

4.5.1.1 DEMAND OUTLOOK

Consumption of softwood logs in the Nordic Countries is expected to increase from an estimated 96.3 million cbm in 1980 to 114.3 million cbm in 2000. This annualized increase of 0.9% is fundamentally supply constrained. By comparison the region's increased consumption of softwood logs in the 1960-80 period is estimated at an annualized rate of 2.0%. As in most other sub-regions, sawlogs have been gradually losing share of total softwood logs consumed, declining from an estimated 50% in 1960 to 45% in 1980 and 44% by 2000.

4.5.1.2 SUPPLY OUTLOOK

The reader's attention is drawn to the 1970 calculation base which the Working Party has prepared. Its estimate of log supply for the 1970 period is about 4% higher than that reported to FAO. The Working Party believes the statistics generated by the Nordic countries to be accurate. Accordingly, it suspects that some of its conversion factors are too severe and that the Nordic countries do not consume quite as much log supply for their product outturn as the Working Party has estimated. For this reason, the Working Party feels that the slight discrepancy in its estimated log supply for 2000 is not unrealistic because such overstatement effectively offsets possible errors in the conversion factors used. The same rationale can be applied to the sawlog imports shown for the 1990-2000 period which might be extremely difficult to acquire at a reasonable cost.

4.5.2 OUTLOOK FOR HARDWOODS

4.5.2.1 DEMAND OUTLOOK

Consumption of hardwood logs in the Nordic countries is expected to rise from 16.3 million cbm in 1980 to 21.8 million cbm by 2000. This projected increase is entirely in hardwood fiber logs with the net consumption of sawlogs expected to decline from 1.9 million cbm to 1.6 million cbm during that period. Table 4.5.2.1 shows that wood residuals are expected to have minimal impact on the fiber for pulp and reconstituted panels because so few are expected to be generated.

4.5.2.2 SUPPLY OUTLOOK

In the mid-1970's about half the removals of hardwoods, predominantly birch, of 15 million cbm was still used as fuelwood. The countries' correspondents forecast total removals to rise to 22.4 million cbm, but those of fuelwood to continue to fall steeply, leaving 19.6 million cbm as industrial wood. Table 4.5.1.2 shows that the Working Party has, in fact, used the slightly higher estimate of 21.1 million cbm as its fiber log supply number for 2000. As in the case of softwoods, the Working Party's consumption estimates for 1970 appear to be based on higher conversion factors than are necessary. Thus the Working Party believes that showing a slightly higher harvest level than estimated by the correspondents is a reasonable approach to giving recognition to that problem.

The region's self-sufficiency in hardwood logs should decline a bit. Its supply of sawlogs, however, is rapidly declining and may be very limited by 2000. For this reason, the Working Party has shown the net imports rising in the sawlog sector after 1990, although pulpwood would clearly be substituted to meet total domestic needs if the sawlog supply is sustained. The fiber log net exports shown for the 1980-2000 period represent the balance between perceived production and consumption requirements. It seems unlikely that they would materialize as actual exports in their raw form rather than as finished products. In any event, the total hardwood log net trade for the Nordic countries should be quite small in the 1980-2000 period.

4.6 OTHER WESTERN EUROPE

This sub-region is a heterogeneous group of countries from the forestry point of view. It includes Austria and Switzerland with their very high growing stock volumes per hectare and the southern European countries (excluding those in the EEC) stretching from Turkey to Portugal. Degrees of self-sufficiency in forest products range from Austria and Portugal, major exporters, to Spain, Switzerland and Greece, which are sizeable net importers. Yugoslavia and Turkey are more or less self-sufficient.

The group holds 33.4 million hectares of exploitable forest and, in addition, 23 million hectares of other wooded land, mainly low quality scrub and coppice which barely contributes to wood production apart from fuelwood. Several countries, notably Spain, have an extensive reforestation program in which pines play an important part, also in certain localities such fast-growing hardwoods as eucalyptus and poplar. This is expected to raise the area of exploitable forest by 28% to 42.6 million hectares by 2000. While in some areas good growth rates are obtained for pines, in many instances the plantations are being established primarily for reasons other than wood production, such as erosion control. Thus, while growing stock and increment will increase, by an estimated 13% and 18% respectively between 1970 and 2000, the expansion will not be at the same rate as exploitable forest area.

Removals, on the other hand, are estimated by the countries in the sub-region to grow by 42% to 52% between the mid-1970's and 2000 to 102-109 million cbm. This seems to reflect the expectation that currently under-utilized resources in several countries of the sub-region will be brought more fully into use. Nonetheless, the actual cut by 2000 should still be less than growth, given the existence of immature plantations in Spain and elsewhere.

4.6.1 OUTLOOK FOR SOFTWOODS

4.6.1.1 DEMAND OUTLOOK

Because of the heterogeneous nature of this sub-region's industry, it is almost meaningless to discuss the movement of aggregate demand factors. The sub-region is expected to increase its consumption of softwood logs from 39.7 million cbm in 1980 to 58.6 million cbm in 2000. Sawlogs should represent about a third of the increase, rising from 25.9 million cbm to 32.0 million cbm. Residuals should play an important part in replacing fiber logs representing 22%-26% of the softwood pulpwood consumed in the 1980-2000 period.

4.6.1.2 SUPPLY OUTLOOK

The main softwood-growing countries of the group are Austria, Turkey, Spain and Yugoslavia. Total removals in 2000 are forecast to reach 65.5 million cbm, an increase of 22.4 million cbm (52%) compared with the mid-1970's. Fuelwood, even of softwood, will still be of some, though of declining, importance in these countries, accounting for an estimated 7.4 million cbm or 11% of the total removals.

Self-sufficiency within this sub-region should stay close to 100%. The group is expected to continue importing some quantities of softwood raw material with net imports in 2000 estimated at 0.5 million cbm. Greece, Spain, Yugoslavia and particularly Austria are already net importers of softwood sawlogs. These added to removals of softwood industrial wood of 58.1 million cbm give a forecast of total supply of softwood industrial raw material of 58.6 million cbm in 2000, an increase of 25.4 million cbm or 78% over the mid-1970's. The main increases are expected in Turkey, Yugoslavia, Austria and Spain.

4.6.2 OUTLOOK FOR HARDWOODS

4.6.2.1 DEMAND OUTLOOK

Consumption of hardwood logs in the Other Western Europe sub-region is expected to grow from 22.9 to 34.4 million cbm in the 1980-2000 period. A slight growth of sawnwood and panels is expected between 1980 and 2000, raising consumption of hardwood logs 1.2% annually from 10.7 to 13.5 million cbm. The major growth, however, is expected to be in hardwood pulpwood where consumption of fiber logs should rise at a 2.7% annualized rate from 12.2 to 20.9 million cbm during that period. Hardwood residuals used for fiber products should double from 1.7 to 3.8 million cbm and account for about 15% of the region's hardwood pulpwood by 2000.

4.6.2.2 SUPPLY OUTLOOK

Hardwoods accounted for 42% of the group's growing stock in 1970. This is expected to decline slightly by 2000. Removals are forecast to reach 43.2 million cbm or 52% more than in the mid-1970's. Of the total removals in 2000, 11.0 million cbm or 25% are expected to be fuelwood and 32.2 million cbm industrial wood.

Self-sufficiency is expected to remain relatively stable in the 94-95% range in the 1980-2000 period. The group reported net imports of 1.3 million cbm of hardwood raw material in the mid-1970's consisting of tropical logs and European pulpwood. Imports of the latter are expected to decline but of the former to rise, giving net imports of hardwoods in 2000 of 2.2 million cbm. Total supply of hardwood industrial raw material in Other Western European countries in 2000 is thus forecast to be 34.4 million cbm, a rise of 20.0 million cbm or 139% on the mid-1970's. A particularly strong growth is estimated by Yugoslavia, with Turkey and Spain also contributing.

The Working Party draws the reader's attention to the marked difference between its 1970 supply estimate and that reported by FAO. It seems doubtful to the Working Party that the region could have produced the 4.3 million cbm of sawnwood and panels recorded for the 1970 period with as little as the reported 5.2 million cbm domestic sawlogs plus 1.1 million cbm imports. Even more dubious is the estimated requirement to make 5.8 million cbm of reconstituted panels and pulp from a fiber log harvest of 3.8 million cbm plus the residuals from fabricated products within the sub-region. In other words, the Working Party believes that some supply may be underreported in this region, either domestic production or possible log imports - either of which might be reported as fuelwood. As a consequence, the Working Party's estimated annual harvest for industrial roundwood in 1969-71 of 15.6 million cbm is higher than FAO/ECE's calculated harvest for 1974-76 of 13.1 million cbm.

TABLE 4.0.1.1

WESTERN EUROPE

ESTIMATED DEMAND ON THE FOREST FOR INDUSTRIAL SOFTWOOD

(Millions of Cubic Meters)

Sawlog Demand	1960	1970	1980	1990	2000
Sawnwood & Sleepers					
Product Volume	39.5	50.1	55.0	58.8	61.2
Residuals Created	27.1	35.1	39.0	44.6	49.0
Gross Wood-in-the-Rough	66.6	85.2	93.9	103.6	110.2
Solidwood Panels					
Product Volume	0.3	0.7	0.6	0.7	0.7
Residuals Created	0.5	0.9	0.5	0.5	0.7
Gross Wood-in-the-Rough	1.1	1.7	1.3	1.3	1.4
Dom. Sawlog Demand	67.7	86.9	95.2	104.9	111.8
Sawlog Trade-Exp(Imp)	(0.8)	(1.0)	(1.5)	(4.5)	(6.1)
Total Sawlog Demand	66.9	85.9	93.7	100.4	105.7
Fiberlog Demand					
Reconstituted Panels	4.7	12.9	21.0	27.2	36.3
Other Ind. Roundwood	13.8	8.7	7.7	6.8	6.5
Pulp	49.4	79.9	92.4	108.1	126.9
Subtotal Demand	67.9	101.5	121.1	142.1	169.7
Less: Residuals Reused Domestically	16.4	18.2	28.6	35.0	40.0
Net Dom. Fiberlog Demand	51.5	83.3	92.5	107.1	129.7
Fiberlog Trade-Exp(Imp)	(2.0)	(7.9)	(4.1)	(4.0)	(3.2)
Total Fiberlog Demand	49.5	75.4	88.4	103.1	126.5
TOTAL DEMAND FOR INDUSTRIAL SOFTWOODS	116.4	161.3	182.1	203.5	232.2

TABLE 4.0.2.1

WESTERN EUROPE

ESTIMATED DEMAND ON THE FOREST FOR INDUSTRIAL HARDWOOD

(Millions of Cubic Meters)

Sawlog Demand	1960	1970	1980	1990	2000
Sawnwood & Sleepers					
Product Volume	10.5	13.4	13.8	14.9	16.4
Residuals Created	7.5	9.8	9.9	10.6	11.8
Gross Wood-in-the-Rough	18.0	23.2	23.7	25.5	28.2
Solidwood Panels					
Product Volume	2.3	3.7	3.6	3.8	3.5
Residuals Created	2.7	4.1	4.2	4.4	4.0
Gross Wood-in-the-Rough	5.0	7.8	7.7	8.2	7.4
Dom. Sawlog	23.0	31.0	31.4	33.7	35.6
Sawlog Trade-Exp(Imp)	(4.8)	(6.5)	(3.8)	(3.7)	(5.2)
Total Sawlog Demand	18.2	24.5	27.6	30.0	30.4
Fiberlog Demand					
Reconstituted Panels	2.1	7.8	14.3	18.9	22.1
Other Ind. Roundwood	8.4	7.7	6.1	5.5	5.5
Pulp	11.4	22.7	29.0	35.9	46.6
Subtotal Demand	21.9	38.2	49.4	60.3	74.2
Less: Residuals Reused Domestically	3.1	5.2	6.3	7.2	8.8
Net Dom. Fiberlog Demand	18.8	33.0	43.1	53.1	65.4
Fiberlog Trade-Exp(Imp)	(0.1)	-	(0.9)	(1.4)	(1.6)
Total Fiberlog Demand	18.7	33.0	42.2	51.7	63.8
TOTAL DEMAND FOR INDUSTRIAL HARDWOODS	36.9	57.5	69.8	81.7	94.2

TABLE 4.0.1.2

WESTERN EUROPE

ESTIMATED SUPPLY AND SELF-SUFFICIENCY TRENDS FOR INDUSTRIAL ROUNDWOOD

(Millions of Cubic Meters)

Softwoods	1960	1970	1980	1990	2000
Sawlogs					
Domestic Supply	66.9	85.9	93.7	100.4	105.7
Net Imports (Exports)	0.8	1.0	1.5	4.5 *	6.1 *
Sawlogs Consumed	67.7	86.9	95.2	104.9	111.8
Residuals Reused					
Domestic Supply	16.4	18.2	28.6	35.0	40.0
Net Imports (Exports)	-	-	-	-	-
Residuals Supplied	16.4	18.2	28.6	35.0	40.0
Fiber Logs					
Domestic Supply	49.5	75.4	88.4	103.1	126.5
Net Imports (Exports)	2.0	7.9	4.1	4.0	3.2
Fiber Logs Consumed	51.5	83.3	92.5	107.1	129.7
Softwood Logs Supplied	116.4	161.3	182.1	203.5	232.2
FAO Report Basis		156.4			
Hardwoods					
Sawlogs					
Domestic Supply	18.2	24.5	27.6	30.0	30.4
Net Imports (Exports)	4.8	6.5	3.8	3.7	5.2 *
Sawlogs Consumed	23.0	31.0	31.4	33.7	35.6
Residuals Reused					
Domestic Supply	3.1	5.2	6.3	7.2	8.8
Net Imports (Exports)	-	-	-	-	-
Residuals Supplied	3.1	5.2	6.3	7.2	8.8
Fiber Logs					
Domestic Supply	18.7	33.0	42.2	51.7	63.8
Net Imports (Exports)	0.1	-	0.9 *	1.4 *	1.6 *
Fiber Logs Consumed	18.8	33.0	43.1	53.1	65.4
Hardwood Logs Supplied	36.9	57.5	69.8	81.7	94.2
FAO Report Basis		52.8			
TOTAL LOGS SUPPLIED	153.3	218.8	251.9	285.2	326.4

TABLE 4.1.1.1

FRANCE

ESTIMATED DEMAND ON THE FOREST FOR INDUSTRIAL SOFTWOOD

(Millions of Cubic Meters)

Sawlog Demand	1960	1970	1980	1990	2000
Sawnwood & Sleepers					
Product Volume	5.0	5.7	5.6	5.6	5.7
Residuals Created	2.8	3.2	3.4	3.7	4.0
Gross Wood-in-the-Rough	7.8	8.9	8.9	9.3	9.8
Solidwood Panels					
Product Volume	-	0.1	0.1	0.1	0.2
Residuals Created	-	0.1	0.1	0.1	0.2
Gross Wood-in-the-Rough	-	0.2	0.3	0.3	0.3
Dom. Sawlog Demand	7.8	9.1	9.2	9.6	10.1
Sawlog Trade-Exp(Imp)	0.5	0.2	(0.1)	(0.5)	(1.0)
Total Sawlog Demand	8.3	9.3	9.1	9.1	9.1
Fiberlog Demand					
Reconstituted Panels	0.3	1.3	1.7	2.5	3.1
Other Ind. Roundwood	1.3	0.8	0.6	0.7	0.8
Pulp	2.7	4.4	5.8	7.5	9.6
Subtotal Demand	4.3	6.5	8.1	10.7	13.5
Less: Residuals Reused Domestically	1.0	1.3	1.9	2.4	2.9
Net Dom. Fiberlog Demand	3.3	5.2	6.2	8.3	10.6
Fiberlog Trade-Exp(Imp)	(0.5)	(0.4)	-	(0.2)	(0.2)
Total Fiberlog Demand	2.8	4.8	6.2	8.1	10.4
TOTAL DEMAND FOR INDUSTRIAL SOFTWOODS	11.1	14.1	15.3	17.2	19.5

TABLE 4.1.2.1

FRANCE

ESTIMATED DEMAND ON THE FOREST FOR INDUSTRIAL HARDWOOD

(Millions of Cubic Meters)

Sawlog Demand	1960	1970	1980	1990	2000
Sawnwood & Sleepers					
Product Volume	3.2	4.0	4.3	4.9	5.4
Residuals Created	2.5	3.1	3.3	3.7	4.0
Gross Wood-in-the-Rough	5.7	7.0	7.6	8.6	9.4
Solidwood Panels					
Product Volume	0.4	0.7	0.7	0.7	0.6
Residuals Created	0.4	0.7	0.7	0.7	0.6
Gross Wood-in-the-Rough	0.8	1.4	1.3	1.3	1.2
Dom. Sawlog	6.5	8.4	8.9	9.9	10.6
Sawlog Trade-Exp(Imp)	(0.3)	(0.7)	(0.4)	(0.2)	-
Total Sawlog Demand	6.2	7.7	8.5	9.7	10.6
Fiberlog Demand					
Reconstituted Panels	0.4	1.2	2.7	4.8	7.0
Other Ind. Roundwood	0.9	0.8	0.7	0.8	1.1
Pulp	1.2	2.6	3.5	4.1	4.8
Subtotal Demand	2.5	4.6	6.9	9.7	12.9
Less: Residuals Reused Domestically	0.7	1.3	1.7	2.0	2.3
Net Dom. Fiberlog Demand	1.8	3.3	5.2	7.7	10.6
Fiberlog Trade-Exp(Imp)	-	-	0.4	0.5	0.7
Total Fiberlog Demand	1.8	3.3	5.6	8.2	11.3
TOTAL DEMAND FOR INDUSTRIAL HARDWOODS	8.0	11.0	14.1	17.9	21.9

TABLE 4.1.1.2

FRANCE

ESTIMATED SUPPLY AND SELF-SUFFICIENCY TRENDS

FOR INDUSTRIAL ROUNDWOOD

(Millions of Cubic Meters)

Softwoods	1960	1970	1980	1990	2000
Sawlogs					
Domestic Supply	8.3	9.3	9.1	9.1	9.1
Net Imports (Exports)	(0.5)	(0.2)	0.1	0.5*	1.0*
Sawlogs Consumed	7.8	9.1	9.2	9.6	10.1
Residuals Reused					
Domestic Supply	1.0	1.3	1.9	2.4	2.9
Net Imports (Exports)	-	-	-	-	-
Residuals Supplied	1.0	1.3	1.9	2.4	2.9
Fiber Logs					
Domestic Supply	2.8	4.8	6.2	8.1	10.4
Net Imports (Exports)	0.5	0.4	-	0.2	0.2
Fiber Logs Consumed	3.3	5.2	6.2	8.3	10.6
Softwood Logs Supplied	11.1	14.1	15.3	17.2	19.5
FAO Report Basis		13.0			
Hardwoods					
Sawlogs					
Domestic Supply	6.2	7.7	8.5	9.7	10.6
Net Imports (Exports)	0.3	0.7	0.4	0.2	-
Sawlogs Consumed	6.5	8.4	8.9	9.9	10.6
Residuals Reused					
Domestic Supply	0.7	1.3	1.7	2.0	2.3
Net Imports (Exports)	-	-	-	-	-
Residuals Supplied	0.7	1.3	1.7	2.0	2.3
Fiber Logs					
Domestic Supply	1.8	3.3	5.6	8.2	11.3
Net Imports (Exports)	-	-	(0.4)*	(0.5)*	(0.7)*
Fiber Logs Consumed	1.8	3.3	5.2	7.7	10.6
Hardwood Logs Supplied	8.0	11.0	14.1	17.9	21.9
FAO Report Basis		12.5			
TOTAL LOGS SUPPLIED	19.1	25.1	29.4	35.1	41.4

TABLE 4.2.1.1

WEST GERMANY

ESTIMATED DEMAND ON THE FOREST FOR INDUSTRIAL SOFTWOOD

(Millions of Cubic Meters)

Sawlog Demand	1960	1970	1980	1990	2000
Sawnwood & Sleepers					
Product Volume	6.3	7.9	8.5	8.9	9.1
Residuals Created	2.5	3.2	3.9	4.9	5.0
Gross Wood-in-the-Rough	8.8	11.1	12.4	13.8	14.2
Solidwood Panels					
Product Volume	0.2	0.2	0.2	0.2	0.2
Residuals Created	0.3	0.2	0.1	0.1	0.1
Gross Wood-in-the-Rough	0.5	0.5	0.3	0.3	0.3
Dom. Sawlog Demand	9.3	11.6	12.7	14.1	14.5
Sawlog Trade-Exp(Imp)	(0.5)	(0.3)	(0.7)	(2.1)	(2.5)
Total Sawlog Demand	8.8	11.3	12.0	12.0	12.0
Fiberlog Demand					
Reconstituted Panels	0.9	3.6	6.0	7.7	9.3
Other Ind. Roundwood	2.6	1.9	1.4	1.3	1.0
Pulp	4.2	4.8	6.3	8.2	9.2
Subtotal Demand	7.7	10.3	13.7	17.2	19.5
Less: Residuals Reused Domestically	2.2	2.8	3.9	4.9	5.0
Net Dom. Fiberlog Demand	5.5	7.5	9.8	12.3	14.5
Fiberlog Trade-Exp(Imp)	(1.3)	(1.6)	-	-	-
Total Fiberlog Demand	4.2	5.9	9.8	12.3	14.5
TOTAL DEMAND FOR INDUSTRIAL SOFTWOODS	13.0	17.2	21.8	24.3	26.5

TABLE 4.2.2.1

WEST GERMANY

ESTIMATED DEMAND ON THE FOREST FOR INDUSTRIAL HARDWOOD

(Millions of Cubic Meters)

Sawlog Demand	1960	1970	1980	1990	2000
Sawnwood & Sleepers					
Product Volume	1.7	2.2	2.2	2.3	2.5
Residuals Created	0.8	1.0	0.9	0.9	1.1
Gross Wood-in-the-Rough	2.5	3.2	3.1	3.2	3.6
Solidwood Panels					
Product Volume	0.7	0.8	0.6	0.6	0.6
Residuals Created	0.8	0.8	0.7	0.7	0.7
Gross Wood-in-the-Rough	1.5	1.6	1.3	1.3	1.3
Dom. Sawlog	4.0	4.8	4.4	4.5	4.9
Sawlog Trade-Exp(Imp)	(1.7)	(1.6)	(0.9)	(1.0)	(1.4)
Total Sawlog Demand	2.3	3.2	3.5	3.5	3.5
Fiberlog Demand					
Reconstituted Panels	0.6	2.5	3.8	4.0	4.4
Other Ind. Roundwood	2.4	1.1	1.2	1.0	0.9
Pulp	1.1	1.3	1.3	1.8	2.2
Subtotal Demand	4.1	4.9	6.3	6.8	7.5
Less: Residuals Reused Domestically	0.6	0.8	0.8	0.8	0.8
Net Dom. Fiberlog Demand	3.5	4.1	5.5	6.0	6.7
Fiberlog Trade-Exp(Imp)	-	-	0.6	0.4	0.4
Total Fiberlog Demand	3.5	4.1	6.1	6.4	7.1
TOTAL DEMAND FOR INDUSTRIAL HARDWOODS	5.8	7.3	9.6	9.9	10.6

TABLE 4.2.1.2
WEST GERMANY
ESTIMATED SUPPLY AND SELF-SUFFICIENCY TRENDS FOR INDUSTRIAL ROUNDWOOD

(Millions of Cubic Meters)

Softwoods	1960	1970	1980	1990	2000
Sawlogs					
Domestic Supply	8.8	11.3	12.0	12.0	12.0
Net Imports (Exports)	0.5	0.3	0.7	2.1*	2.5*
Sawlogs Consumed	9.3	11.6	12.7	14.1	14.5
Residuals Reused					
Domestic Supply	2.2	2.8	3.9	4.9	5.0
Net Imports (Exports)	-	-	-	-	-
Residuals Supplied	2.2	2.8	3.9	4.9	5.0
Fiber Logs					
Domestic Supply	4.2	5.9	9.8	12.3	14.5
Net Imports (Exports)	1.3	1.6	-	-	-
Fiber Logs Consumed	5.5	7.5	9.8	12.3	14.5
Softwood Logs Supplied	13.0	17.2	21.8	24.3	26.5
FAO Report Basis		18.2			
Hardwoods					
Sawlogs					
Domestic Supply	2.3	3.2	3.5	3.5	3.5
Net Imports (Exports)	1.7	1.6	0.9	1.0	1.4
Sawlogs Consumed	4.0	4.8	4.4	4.5	4.9
Residuals Reused					
Domestic Supply	0.6	0.8	0.8	0.8	0.8
Net Imports (Exports)	-	-	-	-	-
Residuals Supplied	0.6	0.8	0.8	0.8	0.8
Fiber Logs					
Domestic Supply	3.5	4.1	6.1	6.4	7.1
Net Imports (Exports)	-	-	(0.6)*	(0.4)*	(0.4)*
Fiber Logs Consumed	3.5	4.1	5.5	6.0	6.7
Hardwood Logs Supplied	5.8	7.3	9.6	9.9	10.6
FAO Report Basis		7.8			
TOTAL LOGS SUPPLIED	18.8	24.5	31.4	34.2	37.1

TABLE 4.3.1.1

UNITED KINGDOM

ESTIMATED DEMAND ON THE FOREST FOR INDUSTRIAL SOFTWOOD

(Millions of Cubic Meters)

Sawlog Demand	1960	1970	1980	1990	2000
Sawnwood & Sleepers					
Product Volume	0.4	0.5	0.8	0.9	1.1
Residuals Created	0.3	0.4	0.6	0.7	0.9
Gross Wood-in-the-Rough	0.7	0.9	1.4	1.6	2.0
Solidwood Panels					
Product Volume	-	-	-	-	-
Residuals Created	-	-	-	-	-
Gross Wood-in-the-Rough	-	-	-	-	-
Dom. Sawlog Demand	0.7	0.9	1.4	1.6	2.0
Sawlog Trade-Exp(Imp)	(0.1)	-	-	-	-
Total Sawlog Demand	0.6	0.9	1.4	1.6	2.0
Fiberlog Demand					
Reconstituted Panels	0.2	0.3	0.8	1.2	1.6
Other Ind. Roundwood	0.4	0.2	0.2	0.2	0.3
Pulp	0.8	0.9	0.7	0.7	2.9
Subtotal Demand	1.4	1.4	1.7	2.1	4.8
Less: Residuals Reused Domestically	0.1	0.2	0.3	0.4	0.6
Net Dom. Fiberlog Demand	1.3	1.2	1.4	1.7	4.2
Fiberlog Trade-Exp(Imp)	(0.3)	(0.3)	-	-	-
Total Fiberlog Demand	1.0	0.9	1.4	1.7	4.2
TOTAL DEMAND FOR INDUSTRIAL SOFTWOODS	1.6	1.8	2.8	3.3	6.2

TABLE 4.3.2.1

UNITED KINGDOM

ESTIMATED DEMAND ON THE FOREST FOR INDUSTRIAL HARDWOOD

(Millions of Cubic Meters)

Sawlog Demand	1960	1970	1980	1990	2000
Sawnwood & Sleepers					
Product Volume	0.8	0.7	0.4	0.3	0.3
Residuals Created	0.5	0.5	0.3	0.2	0.2
Gross Wood-in-the-Rough	1.3	1.1	0.7	0.5	0.5
Solidwood Panels					
Product Volume	-	-	-	-	-
Residuals Created	-	-	-	-	-
Gross Wood-in-the-Rough	-	-	-	0.1	-
Dom. Sawlog	1.3	1.1	0.7	0.6	0.5
Sawlog Trade-Exp(Imp)	(0.6)	(0.3)	-	-	-
Total Sawlog Demand	0.7	0.8	0.7	0.6	0.5
Fiberlog Demand					
Reconstituted Panels	-	0.2	0.3	0.2	0.2
Other Ind. Roundwood	-	-	-	-	-
Pulp	0.1	0.3	0.4	0.4	0.4
Subtotal Demand	0.1	0.5	0.7	0.6	0.6
Less: Residuals Reused Domestically	0.1	0.2	0.2	0.1	0.1
Net Dom. Fiberlog Demand	-	0.3	0.5	0.5	0.5
Fiberlog Trade-Exp(Imp)	-	-	0.3	0.3	0.3
Total Fiberlog Demand	-	0.3	0.8	0.8	0.8
TOTAL DEMAND FOR INDUSTRIAL HARDWOODS	0.7	1.1	1.5	1.4	1.3

TABLE 4.3.1.2

UNITED KINGDOM

ESTIMATED SUPPLY AND SELF-SUFFICIENCY TRENDS FOR INDUSTRIAL ROUNDWOOD

(Millions of Cubic Meters)

Softwoods	1960	1970	1980	1990	2000
Sawlogs					
Domestic Supply	0.6	0.9	1.4	1.6	2.0
Net Imports (Exports)	0.1	-	-	-	-
Sawlogs Consumed	0.7	0.9	1.4	1.6	2.0
Residuals Reused					
Domestic Supply	0.1	0.2	0.3	0.4	0.6
Net Imports (Exports)	-	-	-	-	-
Residuals Supplied	0.1	0.2	0.3	0.4	0.6
Fiber Logs					
Domestic Supply	1.0	0.9	1.4	1.7	4.2
Net Imports (Exports)	0.3	0.3	-	-	-
Fiber Logs Consumed	1.3	1.2	1.4	1.7	4.2
Softwood Logs Supplied	1.6	1.8	2.8	3.3	6.2
FAO Report Basis		1.9			
Hardwoods					
Sawlogs					
Domestic Supply	0.7	0.8	0.7	0.6	0.5
Net Imports (Exports)	0.6	0.3	-	-	-
Sawlogs Consumed	1.3	1.1	0.7	0.6	0.5
Residuals Reused					
Domestic Supply	0.1	0.2	0.2	0.1	0.1
Net Imports (Exports)	-	-	-	-	-
Residuals Supplied	0.1	0.2	0.2	0.1	0.1
Fiber Logs					
Domestic Supply	-	0.3	0.8	0.8	0.8
Net Imports (Exports)	-	-	(0.3) *	(0.3) *	(0.3) *
Fiber Logs Consumed	-	0.3	0.5	0.5	0.5
Hardwood Logs Supplied	0.7	1.1	1.5	1.4	1.3
FAO Report Basis		1.2			
TOTAL LOGS SUPPLIED	2.3	2.9	4.3	4.7	7.5

TABLE 4.4.1.1

OTHER EEC

ESTIMATED DEMAND ON THE FOREST FOR INDUSTRIAL SOFTWOOD

(Millions of Cubic Meters)

Sawlog Demand	1960	1970	1980	1990	2000
Sawnwood & Sleepers					
Product Volume	1.6	1.6	1.7	1.7	1.8
Residuals Created	1.1	1.1	1.2	1.2	1.3
Gross Wood-in-the-Rough	2.6	2.7	2.9	3.0	3.1
Solidwood Panels					
Product Volume	-	0.1	-	0.1	-
Residuals Created	-	0.1	-	-	-
Gross Wood-in-the-Rough	0.1	0.1	0.1	0.1	0.1
Dom. Sawlog Demand	2.7	2.8	3.0	3.1	3.2
Sawlog Trade-Exp(Imp)	(0.8)	(0.8)	-	-	-
Total Sawlog Demand	1.9	2.0	3.0	3.1	3.2
Fiberlog Demand					
Reconstituted Panels	0.3	2.2	3.9	4.3	4.7
Other Ind. Roundwood	1.3	1.5	1.1	0.6	0.5
Pulp	2.0	3.2	3.7	4.6	5.3
Subtotal Demand	3.6	6.9	8.7	9.5	10.5
Less: Residuals Reused Domestically	0.4	0.5	0.7	0.8	1.0
Net Dom. Fiberlog Demand	3.2	6.4	8.0	8.7	9.5
Fiberlog Trade-Exp(Imp)	(1.6)	(2.7)	(4.1)	(4.0)	(3.0)
Total Fiberlog Demand	1.6	3.7	3.9	4.7	6.5
TOTAL DEMAND FOR INDUSTRIAL SOFTWOODS	3.5	5.7	6.9	7.8	9.7

TABLE 4.4.2.1

OTHER EEC COUNTRIES

ESTIMATED DEMAND ON THE FOREST FOR INDUSTRIAL HARDWOOD

(Millions of Cubic Meters)

Sawlog Demand	1960	1970	1980	1990	2000
Sawnwood & Sleepers					
Product Volume	2.0	2.7	2.0	1.8	2.0
Residuals Created	1.4	1.9	1.4	1.3	1.4
Gross Wood-in-the-Rough	3.4	4.6	3.4	3.1	3.4
Solidwood Panels					
Product Volume	0.5	0.7	0.7	0.7	0.5
Residuals Created	0.5	0.7	0.7	0.7	0.6
Gross Wood-in-the-Rough	0.9	1.4	1.4	1.4	1.1
Dom. Sawlog	4.3	6.0	4.8	4.5	4.5
Sawlog Trade-Exp(Imp)	(1.8)	(2.7)	(1.0)	(0.5)	-
Total Sawlog Demand	2.5	3.3	3.8	4.0	4.5
Fiberlog Demand					
Reconstituted Panels	0.4	1.8	3.0	2.9	3.0
Other Ind. Roundwood	0.8	1.9	0.9	0.5	0.4
Pulp	0.8	1.7	2.4	3.1	4.1
Subtotal Demand	2.0	5.4	6.3	6.5	7.5
Less: Residuals Reused Domestically	0.5	0.8	1.0	0.9	1.0
Net Dom. Fiberlog Demand	1.5	4.6	5.3	5.6	6.5
Fiberlog Trade-Exp(Imp)	(0.1)	-	(3.1)	(3.5)	(3.9)
Total Fiberlog Demand	1.4	4.6	2.2	2.1	2.6
TOTAL DEMAND FOR INDUSTRIAL HARDWOODS	3.9	7.9	6.0	6.1	7.1

TABLE 4.4.1.2

OTHER EEC COUNTRIES

ESTIMATED SUPPLY AND SELF-SUFFICIENCY TRENDS FOR INDUSTRIAL ROUNDWOOD

(Millions of Cubic Meters)

Softwoods	1960	1970	1980	1990	2000
Sawlogs					
Domestic Supply	1.9	2.0	3.0	3.1	3.2
Net Imports (Exports)	0.8	0.8	-	-	-
Sawlogs Consumed	2.7	2.8	3.0	3.1	3.2
Residuals Reused					
Domestic Supply	0.4	0.5	0.7	0.8	1.0
Net Imports (Exports)	-	-	-	-	-
Residuals Supplied	0.4	0.5	0.7	0.8	1.0
Fiber Logs					
Domestic Supply	1.6	3.7	3.9	4.7	6.5
Net Imports (Exports)	1.6 *	2.7 *	4.1 *	4.0 *	3.0 *
Fiber Logs Consumed	3.2	6.4	8.0	8.7	9.5
Softwood Logs Supplied	3.5	5.7	6.9	7.8	9.7
FAO Report Basis		4.8			
Hardwoods					
Sawlogs					
Domestic Supply	2.5	3.3	3.8	4.0	4.5
Net Imports (Exports)	1.8	2.7	1.0	0.5 *	- *
Sawlogs Consumed	4.3	6.0	4.8	4.5	4.5
Residuals Reused					
Domestic Supply	0.5	0.8	1.0	0.9	1.0
Net Imports (Exports)	-	-	-	-	-
Residuals Supplied	0.5	0.8	1.0	0.9	1.0
Fiber Logs					
Domestic Supply	1.4	4.6	2.2	2.1	2.6
Net Imports (Exports)	0.1	-	3.1 *	3.5 *	3.9 *
Fiber Logs Consumed	1.5	4.6	5.3	5.6	6.5
Hardwood Logs Supplied	3.9	7.9	6.0	6.1	7.1
FAO Report Basis		8.1			
TOTAL LOGS SUPPLIED	7.4	13.6	12.9	13.9	16.8

TABLE 4.5.1.1

NORDIC

ESTIMATED DEMAND ON THE FOREST FOR INDUSTRIAL SOFTWOOD

(Millions of Cubic Meters)

Sawlog Demand	1960	1970	1980	1990	2000
Sawnwood & Sleepers					
Product Volume	16.7	21.1	22.4	23.9	24.8
Residuals Created	15.2	19.2	20.2	22.9	24.7
Gross Wood-in-the-Rough	31.9	40.3	42.6	46.9	49.5
Solidwood Panels					
Product Volume	0.1	0.2	0.2	0.2	0.3
Residuals Created	0.2	0.4	0.2	0.2	0.3
Gross Wood-in-the-Rough	0.4	0.7	0.4	0.4	0.5
Dom. Sawlog Demand	32.3	41.0	43.0	47.3	50.0
Sawlog Trade-Exp(Imp)	0.1	(0.2)	-	(1.3)	(2.1)
Total Sawlog Demand	32.4	40.8	43.0	46.0	47.9
Fiberlog Demand					
Reconstituted Panels	2.6	3.7	4.6	5.4	7.6
Other Ind. Roundwood	4.2	1.5	1.9	0.7	0.8
Pulp	35.9	58.8	64.8	71.4	78.8
Subtotal Demand	42.7	64.0	70.3	77.5	87.2
Less: Residuals Reused Domestically	10.8	10.5	17.0	20.3	22.9
Net Dom. Fiberlog Demand	31.9	53.5	53.3	57.2	64.3
Fiberlog Trade-Exp(Imp)	1.7	(1.9)	-	0.2	-
Total Fiberlog Demand	33.6	51.6	53.3	57.4	64.3
TOTAL DEMAND FOR INDUSTRIAL SOFTWOODS	66.0	92.4	96.3	103.4	112.2

TABLE 4.5.2.1

NORDIC COUNTRIES

ESTIMATED DEMAND ON THE FOREST FOR INDUSTRIAL HARDWOOD

(Millions of Cubic Meters)

Sawlog Demand	1960	1970	1980	1990	2000
Sawnwood & Sleepers					
Product Volume	0.4	0.4	0.3	0.3	0.3
Residuals Created	0.3	0.3	0.3	0.2	0.3
Gross Wood-in-the-Rough	0.7	0.8	0.6	0.5	0.6
Solidwood Panels					
Product Volume	0.3	0.6	0.5	0.5	0.4
Residuals Created	0.6	1.0	0.8	0.8	0.6
Gross Wood-in-the-Rough	0.9	1.5	1.3	1.3	1.0
Dom. Sawlog	1.6	2.3	1.9	1.8	1.6
Sawlog Trade-Exp(Imp)	-	(0.1)	(0.3)	(0.6)	(1.6)
Total Sawlog Demand	1.6	2.2	1.6	1.2	-
Fiberlog Demand					
Reconstituted Panels	0.4	0.9	1.7	2.9	3.7
Other Ind. Roundwood	0.8	0.3	0.2	0.2	0.2
Pulp	7.1	12.2	13.4	14.8	17.1
Subtotal Demand	8.3	13.4	15.3	17.9	21.0
Less: Residuals Reused Domestically	0.6	1.0	0.9	0.8	0.8
Net Dom. Fiberlog Demand	7.7	12.4	14.4	17.1	20.2
Fiberlog Trade-Exp(Imp)	-	-	0.9	0.9	0.9
Total Fiberlog Demand	7.7	12.4	15.3	18.0	21.1
TOTAL DEMAND FOR INDUSTRIAL HARDWOODS	9.3	14.6	16.9	19.2	21.1

TABLE 4.5.1.2

NORDIC COUNTRIES

ESTIMATED SUPPLY AND SELF-SUFFICIENCY TRENDS FOR INDUSTRIAL ROUNDWOOD

(Millions of Cubic Meters)

Softwoods	1960	1970	1980	1990	2000
Sawlogs					
Domestic Supply	32.4	40.8	43.0	46.0	47.9
Net Imports (Exports)	(0.1)	0.2	-	1.3*	2.1*
Sawlogs Consumed	32.3	41.0	43.0	47.3	50.0
Residuals Reused					
Domestic Supply	10.8	10.5	17.0	20.3	22.9
Net Imports (Exports)	-	-	-	-	-
Residuals Supplied	10.8	10.5	17.0	20.3	22.9
Fiber Logs					
Domestic Supply	33.6	51.6	53.3	57.4	64.3
Net Imports (Exports)	(1.7)	1.9	-	(0.2)	-
Fiber Logs Consumed	31.9	53.5	53.3	57.2	64.3
Softwood Logs Supplied	66.0	92.4	96.3	103.4	112.2
FAO Report Basis		88.6			
Hardwoods					
Sawlogs					
Domestic Supply	1.6	2.2	1.6	1.2	-
Net Imports (Exports)	-	0.1	0.3*	0.6*	1.6*
Sawlogs Consumed	1.6	2.3	1.9	1.8	1.6
Residuals Reused					
Domestic Supply	0.6	1.0	0.9	0.8	0.8
Net Imports (Exports)	-	-	-	-	-
Residuals Supplied	0.6	1.0	0.9	0.8	0.8
Fiber Logs					
Domestic Supply	7.7	12.4	15.3	18.0	21.1
Net Imports (Exports)	-	-	(0.9)*	(0.9)*	(0.9)*
Fiber Logs Consumed	7.7	12.4	14.4	17.1	20.2
Hardwood Logs Supplied	9.3	14.6	16.9	19.2	21.1
FAO Report Basis		11.4			
TOTAL LOGS SUPPLIED	75.3	107.0	113.2	122.6	133.3

TABLE 4.6.1.1

OTHER WESTERN EUROPE

ESTIMATED DEMAND ON THE FOREST FOR INDUSTRIAL SOFTWOOD

(Millions of Cubic Meters)

Sawlog Demand	1960	1970	1980	1990	2000
Sawnwood & Sleepers					
Product Volume	9.5	13.3	16.0	17.8	18.7
Residuals Created	5.3	8.0	9.7	11.2	13.1
Gross Wood-in-the-Rough	14.8	21.3	25.7	29.0	31.8
Solidwood Panels					
Product Volume	-	0.1	0.1	0.1	0.1
Residuals Created	-	0.1	0.1	0.1	0.2
Gross Wood-in-the-Rough	0.1	0.2	0.2	0.2	0.2
Dom. Sawlog Demand	14.9	21.5	25.9	29.2	32.0
Sawlog Trade-Exp(Imp)	-	0.1	(0.7)	(0.6)	(0.5)
Total Sawlog Demand	14.9	21.6	25.2	28.6	31.5
Fiberlog Demand					
Reconstituted Panels	0.4	1.8	4.0	6.1	10.0
Other Ind. Roundwood	4.0	2.8	3.5	3.3	3.1
Pulp	3.8	7.8	11.1	15.7	21.1
Subtotal Demand	8.2	12.4	18.6	25.1	34.2
Less: Residuals Reused Domestically	1.9	2.9	4.8	6.2	7.6
Net Dom. Fiberlog Demand	6.3	9.5	13.8	18.9	26.6
Fiberlog Trade-Exp(Imp)	-	(1.0)	-	-	-
Total Fiberlog Demand	6.3	8.5	13.8	18.9	26.6
TOTAL DEMAND FOR INDUSTRIAL SOFTWOODS	21.2	30.1	39.0	47.5	58.1

TABLE 4.6.2.1

OTHER WESTERN EUROPE

ESTIMATED DEMAND ON THE FOREST FOR INDUSTRIAL HARDWOOD

(Millions of Cubic Meters)

Sawlog Demand	1960	1970	1980	1990	2000
Sawnwood & Sleepers					
Product Volume	2.4	3.4	4.6	5.3	5.9
Residuals Created	2.1	3.0	3.7	4.3	4.8
Gross Wood-in-the-Rough	4.4	6.5	8.3	9.6	10.7
Solidwood Panels					
Product Volume	0.4	0.9	1.1	1.3	1.4
Residuals Created	0.5	1.0	1.3	1.5	1.5
Gross Wood-in-the-Rough	0.9	1.9	2.4	2.8	2.8
Dom. Sawlog	5.3	8.4	10.7	12.4	13.5
Sawlog Trade-Exp(Imp)	(0.4)	(1.1)	(1.2)	(1.4)	(2.2)
Total Sawlog Demand	4.9	7.3	9.5	11.0	11.3
Fiberlog Demand					
Reconstituted Panels	0.3	1.2	2.8	4.1	3.8
Other Ind. Roundwood	3.5	3.6	3.1	3.0	2.9
Pulp	1.1	4.6	8.0	11.7	18.0
Subtotal Demand	4.9	9.4	13.9	18.8	24.7
Less: Residuals Reused Domestically	0.6	1.1	1.7	2.6	3.8
Net Dom. Fiberlog Demand	4.3	8.3	12.2	16.2	20.9
Fiberlog Trade-Exp(Imp)	-	-	-	-	-
Total Fiberlog Demand	4.3	8.3	12.2	16.2	20.9
TOTAL DEMAND FOR INDUSTRIAL HARDWOODS	9.2	15.6	21.7	27.2	32.2

Table 4.6.1.2

OTHER WESTERN EUROPE
ESTIMATED SUPPLY AND SELF-SUFFICIENCY TRENDS FOR INDUSTRIAL ROUNDWOOD

(Millions of Cubic Meters)

Softwoods	1960	1970	1980	1990	2000
Sawlogs					
Domestic Supply	14.9	21.6	25.2	28.6	31.5
Net Imports (Exports)	-	(0.1)	0.7*	0.6*	0.5*
Sawlogs Consumed	14.9	21.5	25.9	29.2	32.0
Residuals Reused					
Domestic Supply	1.9	2.9	4.8	6.2	7.6
Net Imports (Exports)	-	-	-	-	-
Residuals Supplied	1.9	2.9	4.8	6.2	7.6
Fiber Logs					
Domestic Supply	6.3	8.5	13.8	18.9	26.6
Net Imports (Exports)	-	1.0	-	-	-
Fiber Logs Consumed	6.3	9.5	13.8	18.9	26.6
Softwood Logs Supplied	21.2	30.1	39.0	47.5	58.1
FAO Report Basis		29.9			
Hardwoods					
Sawlogs					
Domestic Supply	4.9	7.3	9.5	11.0	11.3
Net Imports (Exports)	0.4	1.1	1.2	1.4	2.2*
Sawlogs Consumed	5.3	8.4	10.7	12.4	13.5
Residuals Reused					
Domestic Supply	0.6	1.1	1.7	2.6	3.8
Net Imports (Exports)	-	-	-	-	-
Residuals Supplied	0.6	1.1	1.7	2.6	3.8
Fiber Logs					
Domestic Supply	4.3	8.3	12.2	16.2	20.9
Net Imports (Exports)	-	-	-	-	-
Fiber Logs Consumed	4.3	8.3	12.2	16.2	20.9
Hardwood Logs Supplied	9.2	15.6	21.7	27.2	32.2
FAO Report Basis		11.8			
TOTAL LOGS SUPPLIED	30.4	45.7	60.7	74.7	90.3

JAPAN

5.0 JAPAN

Forest land in Japan Represents 24 million or 65% of Japan's total land area of 37 million hectares. Of this forest land, about 58% is held in private ownership, much of it in small holdings. Forestry in Japan is to a large extent carried out by small family operations. There are over 2300 associations of forest owners representing 1.8 million members with total forest holdings of only 12 million hectares. This highly dispersed ownership pattern compounds Japan's natural forestry problems, such as terrain and erosion problems which are aggravated by typhoons, earthquakes and difficult road access.

Japan's consumption of fibrous materials has exceeded its domestic supply capability for more than two decades. In recent years it has been a heavy importer of raw fiber for processing into fabricated products. In 1970 it was already importing more than 50% of its sawlogs. Sawlog imports should reach 60% by 1980. Although pulpwood imports were less than 20% of Japan's fiber supply in 1970, they are expected to comprise about 45% by 1980.

Japan has recognized the inherent limitations of its forest resource base and attempted to stimulate further domestic supply through programs designed to encourage afforestation and intensive management. Domestic supply of industrial roundwood which peaked in the range of 50 million cbm in the late 1960's has in recent years been averaging about 40 million cbm. Japan forecasts a return to its former peak level around 1990 with a further supply increment of less than 10 million cbm by 2000.

The Working Party has some reservations about Japan's capability to reach the 58.1 million cbm of log supply which is forecast for 2000. Even if this is achieved, however, a substantial import program will be needed for logs, chips and processed fiber. The Working Party has estimated that the region's net consumption will be in the range of 176 million cbm of which imports will constitute 116 million cbm or roughly two-thirds of the fiber consumed! The comparable number for 1980 is estimated to 113 million cbm consumed of which imports are expected to be 58 million cbm or roughly half. This might suggest that more of the imports will be in the processed form than estimated in Phase IV.

5.0.1 OUTLOOK FOR SOFTWOODS

5.0.1.1 DEMAND OUTLOOK

Japan's consumption of softwood logs should increase from 38.1 million cbm in 1960 to an estimated 48.1 and 100.6 million cbm in 1980 and 2000 respectively. Table 5.0.1.1 shows that the consumption of sawlogs is expected to continue a steady growth in the 1980-2000 period, rising an estimated 1.7% annually from 45.7 million cbm to 63.4 million cbm. This is down somewhat from the estimated softwood sawlog growth of 2.3% in the 1960-80 period. This sustained growth in softwood sawlog consumption is based on the assumption of shortages of tropical hardwood logs from the Far East. It is considerably higher than the Working Party would project if an adequate supply of hardwood sawlogs were expected to be available. There is also an implication for the Japanese sawmill industry of the need to create well over 20 million cbm of new small log sawmill capacity to process the increased product from domestic plantations and the increasing volume of small log imports. A greater availability of hardwood logs or a reluctance or inability of Japanese industry to make investments on this scale could reduce the actual consumption of softwood sawlogs substantially below the estimated 63.4 million cbm in 2000.

Japan's consumption of softwood fiber logs should reach its lowest point about 1980. Pulpwood consumption, however, is expected to continue growing, rising 4.0% annually from an estimated 23.0 million cbm in 1980 to 50.7 million cbm by 2000. The demand for softwood residuals for the reconstituted panel industry is projected to grow at a 6.8% annualized rate, rising from 2.4 million cbm in 1980 to 8.9 million in 2000. Whether or not this industry will be able to grow so quickly to meet Japan's projected panel demand is one of the stress points in the panel outlook and could affect the demand for residuals.

5.0.1.2 SUPPLY OUTLOOK

Softwood removals from Japan's forests are expected to more than double from the 20.5 million cbm produced in 1975 to an estimated 49.6 million cbm in 2000. Japan has undertaken major reforestation programs throughout the country since the end of the war, mostly on private forests. The harvesting period for these plantations begins during the forecast period. It is important to note however that these intensively managed forests are largely on mountainous terrain, ownership is fragmented and costs are high. In the past, lower cost log imports have been an important factor limiting the cut in the Japanese forest. Although the government is promoting cooperatives and increased efficiency in log harvesting and will provide tax incentives to ensure that log owners market their timber, availability of cheaper and competitive log supply from overseas will influence the volume to be harvested in Japan's domestic forests.

Table 5.0.1.2 shows that the recent downward sawlog self-sufficiency trend should be reversed after 1980. Imports of softwood sawlogs are projected to remain fairly constant during the forecast period while domestic production rises. Consequently softwood sawlog self-sufficiency which was 88% in 1960 but 47% by 1975 is expected to reach 54% in 1980 and 59% by 2000. It should be noted, however, that the quality and average diameter of the logs from North America is expected to decline.

Japan's consumption of softwood pulpwood in 1980 is estimated at 23 million cbm. By comparison, it is expected to produce only 1.5 million cbm of fiber logs plus recycle 7.0 million cbm of the 11.4 million cbm of residuals which it generates. This means that the projected demand for softwood pulpwood in 1980 exceeds the domestic supply of fiber logs and residuals by 14.5 million cbm which needs to be offset by imports. Table 5.0.1.2 shows that the Working Party has identified sufficient surplus of mill residuals from North America to fill the bulk of this requirement in 1980. The balance of 1980's softwood pulpwood shortfall is expected to come from Pacific Rim countries and the Soviet Union.

Japan's outlook for softwood pulpwood supplies in the 1980-2000 period is far less favorable. Domestic residual supply should increase by another 6.5 million cbm if Japan can get the necessary sawlogs from domestic or other supply sources. Because North America is expected to use its surplus mill residuals by 2000, however, that major supply increment must be replaced with fiber from other sources. The Working Party has shown on Table 5.0.1.2 imports of softwood fiber logs (which could be in short log or chip form) rising to 24.8 million cbm by 2000. Although perhaps a quarter of this supply could be generated in other Pacific Rim countries, the bulk will need to come from other regions, primarily the Soviet Union. Section 6.0 of this report discloses that Latin America, primarily Chile, might have a few million cbm surplus around the turn of the century, but the transportation cost for moving raw fiber 15,000 kilometers will be severe. Accordingly, the Working Party has balanced Japan's impending softwood shortfall by assuming that the U.S.S.R. will meet the perceived deficit from Siberia - even though this would also probably be very high cost wood. The Working Party is not sure, however, that Japan will in fact reach such a level of dependency. It seems probable that the cost factors associated with such a requirement would militate toward lower consumption of paper and board, cause more pulp to be produced offshore and intensify development of technologies using hardwoods.

5.0.2 OUTLOOK FOR HARDWOODS

5.0.2.1 DEMAND OUTLOOK

Japan's consumption of hardwood logs is expected to decline during the forecast period. Table 5.0.2.1 shows that calculated consumption of industrial hardwoods was 17.6 million cbm in 1960. This is expected to reach 42.2 million cbm in 1980 and then roughly stabilize at that level over the next two decades.

Within this projected stability, however, lies a steep decline in the consumption of sawlogs and veneer logs. Sawlogs and veneer logs constituted 63% of the hardwood logs consumed. This share is expected to decline to 59% in 1980 and then plummet to 32% by 2000. The reasons underlying this expected shift are the anticipated shortages of sawlogs and veneer log supply from South East Asia, greater availability of domestic softwood resources and perhaps a traditional preference for softwood lumber in house construction.

Consumption of hardwood fibers for reconstituted panels and pulp should increase from 6.8 million cbm in 1960 to 21.8 million cbm in 1980 and 32.6 million cbm in the year 2000. The pulp and paper industry's share of this demand is estimated at 66% in 1960, 88% in 1980, and 91% in the year 2000. Mill residuals from domestic sources are estimated to reach 21% of hardwood pulpwood in 1980 but then decline to less than 10% by 2000 as the shortage of hardwood sawlogs and veneer logs produces less chips.

5.0.2.2 SUPPLY OUTLOOK

Roughly 50% of Japan's forest cover is in hardwood, but plantation efforts since the end of the war have been directed towards softwoods. Consequently, domestic hardwood production is projected to decline in the forecast period. After peaking at 6.9 million cbm in the late 1960's, sawlog production is expected to decline to 3.9 million cbm in 1980 and 1.9 million cbm by 2000. Fiber log production is expected to decline from its 1970 peak of 14.6 million cbm to less than half that level by 2000. The Working Party notes a significant difference between FAO's report of hardwood fiber log production in the 1969-71 period which averages 12.1 million cbm compared with the Working Party's estimate of 14.6 million cbm. The Working Party believes that its yield factors for pulp and panels are very tight so that the discrepancy comes from the pulpwood supply. Some of this could also arise, however, from an underestimation of residuals reused in 1970 (34% of the 11.0 million cbm created). The Working Party has raised its estimate for reuse of hardwood residuals to 41% in 1980 and 52% by 2000. Even if this factor is too conservative for year 2000, however, Japan will need massive hardwood pulpwood imports because of the low projected sawlog supply.

Japan has been a large importer of hardwood sawlogs since 1960. These imports are forecast to decline from 21.0 million cbm in 1980 to 12.1 million cbm in 2000. Self-sufficiency in hardwood sawlogs was 48% in 1960 but should fall rapidly reaching 16% in 1980 and to 14% in 2000. As a result of the changing species and quality of the hardwood sawlog supply from the Far East Region and the growth of processing in that Region, the availability of hardwood logs for exports to Japan is likely to become a supply stress point towards the end of the forecast period.

Japan has traditionally been a leader in the utilization of hardwood chips in the pulp and paper industry. With the anticipated shift in plywood and sawnwood production from Japan to the Far East Region, self-sufficiency in hardwood chips is expected to decline although overall supply increases. Total domestic residuals reused for forest products is estimated to rise from 0.3 million cbm in 1960 to 4.5 million cbm in 1980 and then fall to 3.2 million cbm in 2000. As a result, self-sufficiency for hardwood fiber materials other than sawlogs (fiber logs plus chip) is expected to decline from 100% in 1960 to 73% in 1980 and 30% in 2000.

As in softwood, the fiber demand projected exceeds projected supply by 5.8 million cbm in 1980 and 22.8 million cbm in 2000. This will have to be covered by additional residual imports or the demand will have to be reduced.

TABLE 5.0.1.1

JAPAN

ESTIMATED DEMAND ON THE FOREST FOR INDUSTRIAL SOFTWOOD

(Millions of Cubic Meters)

Sawlog Demand	1960	1970	1980	1990	2000
Sawnwood & Sleepers					
Product Volume	21.4	32.5	34.3	42.1	44.4
Residuals Created	7.4	10.9	11.4	14.0	16.6
Gross Wood-in-the-Rough	28.8	43.4	45.7	56.1	61.0
Solidwood Panels					
Product Volume	-	-	-	0.7	1.2
Residuals Created	-	-	-	0.7	1.2
Gross Wood-in-the-Rough	-	-	-	1.4	2.4
Dom. Sawlog Demand	28.8	43.4	45.7	57.5	63.4
Sawlog Trade-Exp(Imp)	(3.4)	(18.4)	(21.2)	(23.2)	(26.2)
Total Sawlog Demand	25.4	25.0	24.5	34.3	37.2
Fiberlog Demand					
Reconstituted Panels	0.2	0.6	2.4	5.7	8.9
Other Ind. Roundwood	3.3	1.4	1.1	1.0	1.0
Pulp	7.7	12.0	19.5	28.1	40.8
Subtotal Demand	11.2	14.0	23.0	34.8	50.7
Less: Dom. Res. Used	1.9	5.5	7.0	10.6	13.5
Less: Imp. Res. Used	-	4.5	13.6	13.3	-
Net Dom. Fiberlog Demand	9.3	4.0	2.4	10.9	37.2
Fiberlog Trade-Exp(Imp)	(0.3)	(0.2)	(0.9)	(7.0)	(24.8)
Total Fiberlog Demand	9.0	3.8	1.5	3.9	12.4
TOTAL DEMAND FOR INDUSTRIAL SOFTWOODS	34.4	28.8	26.0	38.2	49.6

TABLE 5.0.2.1

JAPAN

ESTIMATED DEMAND ON THE FOREST FOR INDUSTRIAL HARDWOOD

(Millions of Cubic Meters)

Sawlog Demand	1960	1970	1980	1990	2000
Sawnwood & Sleepers					
Product Volume	5.1	9.0	7.1	5.5	4.3
Residuals Created	3.0	4.7	4.2	3.2	2.5
Gross Wood-in-the-Rough	8.1	13.7	11.3	8.7	6.8
Solidwood Panels					
Product Volume	1.5	6.6	6.8	4.3	3.6
Residuals Created	1.5	6.3	6.8	4.3	3.6
Gross Wood-in-the-Rough	3.0	12.9	13.6	8.6	7.2
Dom. Sawlog	11.1	26.6	24.9	17.3	14.0
Sawlog Trade-Exp(Imp)	(5.8)	(20.0)	(21.0)	(14.5)	(12.1)
Total Sawlog Demand	5.3	6.6	3.9	2.8	1.9
Fiberlog Demand					
Reconstituted Panels	0.5	1.7	2.6	2.7	2.9
Other Ind. Roundwood	1.8	0.8	0.1	0.1	0.1
Pulp	4.5	16.2	19.1	24.4	29.6
Subtotal Demand	6.8	18.7	21.8	27.2	32.6
Less: Residuals Reused Domestically	0.3	3.7	4.5	3.4	3.2
Net Dom. Fiberlog Demand	6.5	15.0	17.3	23.8	29.4
Fiberlog Trade-Exp(Imp)	-	(0.4)	(5.8)	(15.2)	(22.8)
Total Fiberlog Demand	6.5	14.6	11.5	8.6	6.6
TOTAL DEMAND FOR INDUSTRIAL HARDWOODS	11.8	21.2	15.4	11.4	8.5

TABLE 5.0.1.2

JAPAN

ESTIMATED SUPPLY AND SELF-SUFFICIENCY TRENDS FOR INDUSTRIAL ROUNDWOOD

(Millions of Cubic Meters)

Softwoods	1960	1970	1980	1990	2000
Sawlogs					
Domestic Supply	25.4	25.0	24.5	34.3	37.2
Net Imports (Exports)	3.4	18.4	21.2	23.2	26.2
Sawlogs Consumed	28.8	43.4	45.7	57.5	63.4
Residuals Reused					
Domestic Supply	1.9	5.5	7.0	10.6	13.5
Net Imports (Exports)	-	4.5	13.6	13.3	-
Residuals Supplied	1.9	10.0	20.6	23.9	13.5
Fiber Logs					
Domestic Supply	9.0	3.8	1.5	3.9	12.4
Net Imports (Exports)	0.3	0.2	0.9	7.0	24.8
Fiber Logs Consumed	9.3	4.0	2.4	10.9	37.2
Softwood Logs Supplied	34.4	28.8	26.0	38.2	49.6
FAO Report Basis		26.9			
Hardwoods					
Sawlogs					
Domestic Supply	5.3	6.6	3.9	2.8	1.9
Net Imports (Exports)	5.8	20.0	21.0	14.5	12.1
Sawlogs Consumed	11.1	26.6	24.9	17.3	14.0
Residuals Reused					
Domestic Supply	0.3	3.7	4.5	3.4	3.2
Net Imports (Exports)	-	-	-	-	-
Residuals Supplied	0.3	3.7	4.5	3.4	3.2
Fiber Logs					
Domestic Supply	6.5	14.6	11.5	8.6	6.6
Net Imports (Exports)	-	0.4	5.8	15.2	22.8
Fiber Logs Consumed	6.5	15.0	17.3	23.8	29.4
Hardwood Logs Supplied	11.8	21.2	15.4	11.4	8.5
FAO Report Basis		18.7			
TOTAL LOGS SUPPLIED	46.2	50.0	41.4	49.6	58.1

LATIN AMERICA

6.0 LATIN AMERICA

Latin America's demand for industrial roundwood is projected to grow from 52.5 million cbm to 118.9 million cbm between 1980 and 2000. This is equivalent to an annual growth of 4.2%. The region's share of world fiber consumed for industrial products should rise from 2.5% in 1960 to an estimated 3.6% and 5.7% in 1980 and 2000 respectively. Sawlogs are projected to represent a declining proportion of the region's log requirements, dropping from estimated levels of 84.3% in 1960 and 60% in 1980 to 50% by 2000. As in other developing areas, residuals are expected to represent a minor proportion of fiber supply, equalling about 13.8% of the region's pulpwood consumed in 1980 but only 9.2% by the year 2000. Softwoods should rapidly increase their share of the region's fiber consumed as plantations in Brazil and Chile come into fruition, rising from an estimated 38.5% in 1980 to 48.2% by 2000.

Latin America contains approximately 655 million hectares of forest land of which 50 to 60% is publicly owned. Brazil has by far the largest forest area and accounts for more than 50% of the total. The Latin America forest contains about 100 billion cbm of growing stock. Of this inventory, an estimated 96% is hardwood. Extensive planting is now in progress in the region. Currently an estimated 3.5 million hectares is in plantations excluding those for charcoal. Of these man made forests, 40% are hardwood, 60% softwood.

6.1 OUTLOOK FOR SOFTWOODS

6.1.1 DEMAND OUTLOOK

Fiber demand by Latin America's softwood processing industries is expected to rise from 10.2 million cbm in 1960 to an estimated 20.2 million cbm and 57.3 million cbm in 1980 and 2000 respectively. This is equivalent to an annualized growth rate of 5.4% between 1980 and 2000.

Sawlog demand is gradually expected to lose share as the region's pulp industry emerges, dropping from 92.2% in 1960 to an estimated 60.4% in 1980 and 35.8% by 2000. Although sawlog demand is expected to keep growing slowly, the annualized rate between 1970 and 2000 is only 1.5%. Table 6.0.1.1 shows that softwood sawlog consumption for domestic conversion should increase from 13.3 million cbm in 1970 to 20.5 million cbm in 2000. A temporary decline in consumption is projected during the next few years because of the low production expected in Brazil's Parana region.

Table 6.0.1.1 also shows that the gross domestic demand for pulpwood in 2000 should grow about 7.4% annually from an estimated 9.4 million cbm in 1980 to 39.3 million cbm in 2000. As noted in Phase IV, about 7.9% of this demand is projected for export primarily in the form of bleached chemical pulp.

By year 2000 this projected combination of domestic and export demand is estimated to represent 7.1% of the world's softwood pulpwood consumption. Residuals are expected to remain a small proportion of Latin America's softwood pulpwood supply, equivalent to an estimated 16% in 1980, but falling to about 6% by 2000.

6.1.2 SUPPLY OUTLOOK FOR SOFTWOODS

The supply outlook for Latin America is the joint product of FAO and the Working Party. FAO's regional office in Santiago, Chile, has provided a recent assessment of the potential supply from plantations in Brazil and Chile. The basic forest and plantation data for Brazil and the balance of Latin America has come from a number of independent sources. Using these sources of information, the Working Party and FAO have jointly developed updated supply projections to the end of the century for Latin America's most significant timber producing areas. In making these projections, the Working Party and FAO have relied heavily on judgment tempered by field experience and general acquaintance with the region. Particular consideration has been given to the inventories and anticipated harvest rates in the natural softwood forest of Mexico, Central America and especially the Parana Pine forest of Brazil.

Two countries in Latin America, Brazil and Chile, already have established extensive softwood plantations. Although plantations in Argentina, Mexico and Venezuela will likely make significant contributions to domestic supplies, it is Brazil and Chile's plantations which are expected to supply the bulk of Latin America's softwood fiber during the balance of this century. These two countries alone should supply about 49.5 million cbm of the region's 62.5 million cbm in 2000. Table 6.0.1.2 shows the Working Party's estimates for this region's supply which should almost triple between 1980 and 2000.

As noted above, softwood plantations are expected to provide a major new increment of fiber in Latin America. In developing its outlook for plantation fiber supply, the combined FAO/Working Party team has intensively evaluated the progress of Brazil and Chile. For these two countries it has prepared year-by-year estimates of stand establishment, stand survival, rotation age, volume of thinnings and final harvest of sawlogs. The bulk of the successful plantations in both of these countries have been established during the last decade. With softwood sawlog rotations typically running 25 years, the major benefit from these plantations will not occur until the end of this century.

The following table shows the Working Party's estimates for potential softwood sawlog supplies in Latin America. In addition to the 24.8 million cbm forecast to be available from

Brazil and Chile in the year 2000, 13.0 million cbm are likely to be available. Mexico is not expected to have a significant plantation supply during this decade (perhaps 0.4 million cbm after 1990) but is expected to increase its supply from natural forests to almost 4.0 million cbm by the year 2000. Since the trees associated with the sawlog supply forecast have already been planted, the Working Party believes its projections of potential supply to be quite firm.

LATIN AMERICAN SOFTWOODS

ESTIMATED MAXIMUM SAWLOG SUPPLY

(Millions of Cubic Meters)

	BRAZIL		CHILE		OTHER		TOTAL		
	Natural Forests	Plantations	Natural Forests	Plantations	Natural Forests	Plantations	Natural Forests	Plantations	Total
1975	6.3	-	-	3.2	4.5	1.0	10.8	4.2	15.0
1980	4.4	0.3	-	3.6	4.3	2.0	8.7	5.6	14.6
1985	2.6	0.8	-	3.3	4.3	3.2	6.9	7.3	14.2
1990	0.7	3.0	-	4.0	4.1	5.3	4.8	12.4	17.1
1995	-	6.7	-	5.3	4.2	8.0	4.2	20.0	24.2
2000	-	9.3	-	15.5	4.7	9.7	4.7	34.5	39.2

The outlook for fiber logs and residuals for the region as a whole is closely related to the plantation development programs in Brazil and Chile, both of which are expected to heavily adopt sawtimber rotations for their softwoods. Most of the region's softwood pulpwood during the next two decades should come from thinnings of sawtimber stands. The following table shows how rapidly the pulpwood supply is expected to build up within the region. It also shows an estimate for the maximum residuals which the region might consume or export if all sawlogs were converted within the region.

LATIN AMERICAN SOFTWOOD

ESTIMATED MAXIMUM SUPPLY OF FIBER LOGS AND RESIDUALS

(Millions of Cubic Meters)

	BRAZIL		CHILE		OTHER		TOTAL		
	Fiber Logs	Residuals	Fiber Logs	Residuals	Fiber Logs	Residuals	Fiber Logs	Residuals	Total
1975	4.3	1.5	2.4	0.5	1.0	1.3	7.7	3.3	11.0
1980	5.4	1.2	2.6	0.5	1.6	1.5	9.6	3.2	12.8
1985	10.1	0.7	3.1	0.5	2.5	1.8	15.7	3.0	18.7
1990	14.5	0.8	5.9	0.6	3.3	2.3	23.7	3.7	27.4
1995	20.2	1.4	7.3	0.8	3.9	3.0	31.4	5.2	36.6
2000	22.7	2.0	9.7	2.3	4.4	3.5	36.8	7.7	44.5

Comparison of Table 6.0.2.1 with the above sawlog and fiber log tables indicates that the Working Party has not shown the region's potential softwood supply to be fully utilized during the forecast period. The potential sawlog supply, for example, is estimated at 39.2 million cbm but only 25.5 million cbm is forecast to be harvested on the preferred schedule. One should note, however, that the maximum potential supply for 1995 is estimated at 24.2 million cbm. An additional 9.0 million cbm are projected available to enter the sawlog stream in Chile alone between 1998 and 2000. However, the Working Party believes that much of this potential harvest will remain on the stump a few extra years.

Log exports, almost entirely from Chile, are expected to reach only 5.0 million cbm in 2000 because of Japan's species preference for white woods from North America and the Soviet Union. The reader should carefully note, howeever, that Chile is expected to have an extensive surplus of radiatta pine sawlogs around the turn of the century which could form the basis for a major log trade or processed solidwood products business.

A small surplus of softwood pulpwood should also be available in Latin America in 2000. The Working Party has calculated a domestic demand for 39.3 million cbm of fiber logs and residuals. The fiber log supply should provide about 36.8 million cbm (allowing 0.2 million cbm for export). Residuals available for pulping could, however, be as much as 5.0 million cbm. This estimate is based on about 60% of mill residuals being economically available and a domestic sawlog consumption of 20.5 million cbm. If a major export market for processed solidwood products should develop, such residuals could potentially reach the 7.7 million cbm shown in the table above. Thus a latent potential supply of

2.5 million cbm to 5.2 million cbm of surplus chips should exist based on the Working Party's calculation of fiber log consumption. Considering that the world's softwood pulp consumption should be rising at a roundwood equivalent of about 18 million cbm annually at that time, any surplus which might temporarily exist should be quickly brought into the product stream.

6.2 OUTLOOK FOR HARDWOODS

6.2.1 DEMAND OUTLOOK

Latin America's total demand for industrial roundwood hardwood fibers is expected roughly to double by year 2000, rising at an annualized rate of 3.3% during the next two decades. Compared with an estimated level of 32.3 million cbm in 1980, the region's net domestic roundwood consumption should reach about 61.6 million cbm by 2000, equivalent to about 9.2% of the world's hardwood demand.

Consumption of sawlogs is expected to double between 1980 and 2000, rising from an estimated 18.4 million cbm in 1980 to 36.4 million cbm in 2000. Consumption of fiber logs should almost double as well, growing from 13.9 million cbm to 25.2 million cbm in the 1980-2000 period. Residuals are expected to supply about 3.8 million cbm of the region's fiber log equivalent requirements at that time which otherwise would have reached an estimated level of 29.0 million cbm.

6.2.2 SUPPLY OUTLOOK

Latin America's supply outlook for hardwoods is again the joint product of FAO and industry. There is, however, a substantial difference in the total supply significance of the hardwood vs. the softwood plantation projections. The region has vast stands of hardwoods which will go untapped throughout the forecast period. Included in the region's inventory are extensive areas of stands of sawlog size material in species relatively unknown and poorly established in world markets. Although some facilities now exist in the Amazon basin to produce high quality sliced veneers, these investments have scarcely tapped Latin American hardwood supply potential. The region's potential for mixed tropical species for pulping is immense.

Nonetheless, due to better accessibility plus preferred and more uniform wood properties, species grown in hardwood plantations are expected to play a dominant role in the region's fiber balance. Eucalyptus, gmelina and willow plantations are expected to provide extensive supplies to feed the region's pulp mills. These plantations can be harvested in an eight-year rotation. Moreover, they will coppice twice yielding a conservatively estimated 250 cbm per hectare over the three harvests.

The vast bulk of Latin America's hardwood plantations are in Brazil. During the current decade Brazil has been planting about 130,000 hectares of hardwood annually, up from an estimated average of 34,000 hectares in the 1960's. The plantations already established should yield about 24.3 million cbm annually in the mid-1980's. By comparison, the yield of Brazilian hardwood plantations in 1975 and 1980 is estimated at 5.6 and 17.1 million cbm respectively. Some of this 24.3 million cbm mid-1980 supply will clearly be directed toward the production of charcoal of reconstituted panels. If it were all channelled into white chemical pulp, it would be sufficient to produce more than six million tons of white pulp or 15% of the world's supply in 2000. This is more than the Working Party has estimated for the entire Other Eastern Hemisphere region.

After evaluating Brazil's present hardwood plantation program and its supply implications, the Working Party has projected a decline in the new hardwood plantation establishment rate to about 110,000 hectares annually for the 1980-2000 period. Reasons for this projected deceleration are a likely cessation of tax concessions as well as the difficulty which Brazil may have in developing a pulp export industry. A multi-billion dollar capital investment program is needed to process the softwood supplies which are already projected for 1980's.

Despite the probable success of Brazil, Phase IV projects that Latin America will not grow as rapidly as Africa, the Far East and Oceania in developing a hardwood pulp export business. Should this assumption prove correct, it will not be because of fiber limitations. Brazil has demonstrated that very little lead time is required to develop a significant area of highly productive hardwood plantations or a pulpwood rotation. A relatively small incremental supply would permit Brazil to expand its processing capacity sufficiently to enable it alone to surpass the entire white pulp output projected for Africa, Oceania and the Far East.

TABLE 6.0.1.1

LATIN AMERICA

ESTIMATED DEMAND ON THE FOREST FOR INDUSTRIAL SOFTWOOD

(Millions of Cubic Meters)

Sawlog Demand	1960	1970	1980	1990	2000
Sawnwood & Sleepers					
Product Volume	5.5	7.8	6.9	8.3	11.5
Residuals Created	3.7	5.0	4.6	5.5	7.6
Gross Wood-in-the-Rough	9.2	12.8	11.5	13.8	19.1
Solidwood Panels					
Product Volume	0.1	0.3	0.4	0.6	0.9
Residuals Created	0.1	0.2	0.3	0.4	0.6
Gross Wood-in-the-Rough	0.2	0.5	0.7	1.0	1.4
Dom. Sawlog Demand	9.4	13.3	12.2	14.8	20.5
Sawlog Trade-Exp(Imp)	-	-	2.4	2.3	5.0
Total Sawlog Demand	9.4	13.3	14.6	17.1	25.5
Fiberlog Demand					
Reconstituted Panels	0.1	0.5	0.9	1.3	1.5
Other Ind. Roundwood	0.3	0.6	0.7	0.9	1.0
Pulp	1.4	4.3	7.8	19.0	36.8
Subtotal Demand	1.8	5.4	9.4	21.2	39.3
Less: Residuals Reused Domestically	1.0	1.5	1.5	1.8	2.5
Net Dom. Fiberlog Demand	0.8	3.9	8.0	19.4	36.8
Fiberlog Trade-Exp(Imp)	-	-	-	2.0	0.2
Total Fiberlog Demand	0.8	3.9	8.0	21.4	37.0
TOTAL DEMAND FOR INDUSTRIAL SOFTWOODS	10.2	17.2	22.6	38.5	62.5

TABLE 6.0.2.1

LATIN AMERICA

ESTIMATED DEMAND ON THE FOREST FOR INDUSTRIAL HARDWOOD

(Millions of Cubic Meters)

Sawlog Demand	1960	1970	1980	1990	2000
Sawnwood & Sleepers					
Product Volume	6.8	8.3	10.4	14.9	18.2
Residuals Created	3.8	4.6	5.8	8.3	10.9
Gross Wood-in-the-Rough	10.6	13.0	16.2	23.1	29.1
Solidwood Panels					
Product Volume	0.3	0.6	1.4	2.7	4.7
Residuals Created	0.1	0.3	0.8	1.5	2.6
Gross Wood-in-the-Rough	0.4	0.9	2.2	4.1	7.3
Dom. Sawlog	11.0	13.9	18.4	27.2	36.4
Sawlog Trade-Exp(Imp)	0.1	0.2	-	-	-
Total Sawlog Demand	11.1	14.1	18.4	27.2	36.4
Fiberlog Demand					
Reconstituted Panels	0.1	0.9	1.3	2.1	2.3
Other Ind. Roundwood	2.7	5.7	6.8	8.1	9.5
Pulp	1.3	4.0	7.8	13.1	17.2
Subtotal Demand	4.1	10.6	15.9	23.3	29.0
Less: Residuals Reused Domestically	1.1	1.4	2.0	2.9	3.8
Net Dom. Fiberlog Demand	3.0	9.2	13.9	20.4	25.2
Fiberlog Trade-Exp(Imp)	-	-	-	-	-
Total Fiberlog Demand	3.0	9.2	13.9	20.4	25.2
TOTAL DEMAND FOR INDUSTRIAL HARDWOODS	14.1	23.3	32.3	47.6	61.6

TABLE 6.0.1.2

LATIN AMERICA

ESTIMATED SUPPLY AND SELF-SUFFICIENCY TRENDS FOR INDUSTRIAL ROUNDWOOD

(Millions of Cubic Meters)

Softwoods	1960	1970	1980	1990	2000
Sawlogs					
Domestic Supply	9.4	13.3	14.6	17.1	25.5
Net Imports (Exports)	-	-	(2.4)*	(2.3)*	(5.0)*
Sawlogs Consumed	9.4	13.3	12.2	14.8	20.5
Residuals Reused					
Domestic Supply	1.0	1.5	1.5	1.8	2.5
Net Imports (Exports)	-	-	-	-	-
Residuals Supplied	1.0	1.5	1.5	1.8	2.5
Fiber Logs					
Domestic Supply	0.8	3.9	8.0	21.4	37.0
Net Imports (Exports)	-	-	-	(2.0)	(0.2)
Fiber Logs Consumed	0.8	3.9	8.0	19.4	36.8
Softwood Logs Supplied	10.2	17.2	22.6	38.5	62.5
FAO Report Basis		21.4			
Hardwoods					
Sawlogs					
Domestic Supply	11.1	14.1	18.4	27.2	36.4
Net Imports (Exports)	(0.1)	(0.2)	-	-	-
Sawlogs Consumed	11.0	13.9	18.4	27.2	36.4
Residuals Reused					
Domestic Supply	1.1	1.4	2.0	2.9	3.8
Net Imports (Exports)	-	-	-	-	-
Residuals Supplied	1.1	1.4	2.0	2.9	3.8
Fiber Logs					
Domestic Supply	3.0	9.2	13.9	20.4	25.2
Net Imports (Exports)	-	-	-	-	-
Fiber Logs Consumed	3.0	9.2	13.9	20.4	25.2
Hardwood Logs Supplied	14.1	23.3	32.3	47.6	61.6
FAO Report Basis		26.2			
TOTAL LOGS SUPPLIED	24.3	40.5	54.9	86.1	124.1

OTHER EASTERN HEMISPHERE

7.0 OTHER EASTERN HEMISPHERE

The Other Eastern Hemisphere contains an estimated 500 million hectares of forest land of which 70-80% is publicly owned. Approximately 50% of the forest area is in the Far East, 38% in Africa South of the Sahara, 9% in Oceania and the remaining 20% in the Middle East and North Africa. The region contains an estimated 68 million cbm of growing stock of which perhaps 85% is hardwood. Plantations now account for about 8 million hectares, 70% of which is hardwood.

7.0.1 DEMAND OUTLOOK

Consumption of industrial roundwood in the Other Eastern Hemisphere is projected to double from 127.9 million cbm in 1980 to 255.1 million cbm in 2000. This is equivalent to a 3.5% annualized growth rate, up marginally from the 3.4% rate projected for the 1960-80 period. Hardwoods are expected to remain the predominant species but lose share, declining gradually from 83.4% in 1960 to 80.6% and 76.4% in 1980 and 2000 respectively. Sawlogs should represent close to two thirds of the logs consumed during the forecast period. Tables 7.0.1.1, 7.0.1.2 and 7.0.2.1 show the aggregate demand and supply outlook projected for the region's fiber.

7.0.2 SUPPLY OUTLOOK

Within the Other Eastern Hemisphere region lie four markedly different forest industry sub-regions. Oceania is expected to switch its log production from 57.5% hardwoods in 1960 to an estimated 65.5% softwoods by 2000. The Middle East and North Africa is expected to be about 100% self-sufficient for its logs, with hardwood logs accounting for almost 90% of its supply throughout the study period. Sawlogs in Africa South of the Sahara should account for less than half of this sub-region's log supply and over 30% of the hardwood sawlogs should be exported during the next two decades. In the Far East, however, sawlogs are expected to represent 70-80% of the region's log supply, but log exports are expected to be less than 10% of hardwood sawlogs produced by 2000.

The supply outlook presented in this section of the report is again based on a joint cooperative effort between FAO and the Working Party. FAO has submitted a detailed forest resource questionnaire to most forest rich countries within the region. This questionnaire has covered topics such as the area under forest cover, trends in the area converted to non-forest uses, area planted and expected yield by type of management regime and species. FAO has reported its findings regarding this survey at the 8th World Forestry Congress in Djakarta. FAO's assessment has provided the basis for the Working Party's supply outlook, particularly in Africa South of the Sahara and the Far East where FAO has assisted the Working Party in developing country-by-country estimates of the potential harvest. The supply outlooks developed for Oceania and the Middle East and North Africa sub-regions have been developed by the Working Party without the specific support of FAO.

7.1 OCEANIA

7.1.1 OUTLOOK FOR SOFTWOODS

7.1.1.1 DEMAND OUTLOOK

Fiber consumption by Oceania's softwood processing industries is expected to grow from 5.9 million cbm in 1960 and 11.9 million cbm in 1980 to 30.8 million cbm in 2000! Table 7.1.1.1 shows that a dramatic increase in growth is projected for both the sawnwood and pulp sectors. Sawlog consumption should more than double in the 1980-2000 period, rising from 8.1 million cbm in 1980 to 18.8 million cbm in 2000, a 4.3% annualized rate.

7.1.1.2 SUPPLY OUTLOOK

Softwood supply from Oceania is based on extensive plantations primarily in Australia, New Zealand, and to some extent in Fiji. In New Zealand alone some 40-45,000 hectares or more are being planted per year. Table 7.1.1.2 shows that total softwood sawlog supply is estimated to rise from 10 million cbm in 1980 to 25.4 million cbm in 2000. This represents more than a four-fold increase above the 1960 supply level of 5.7 million cbm. Because domestic production is not expected to keep pace with this increase, sawlog exports should more than triple between 1980 and 2000, rising from 1.9 million cbm to 6.6 million cbm.

The fiber log supply should increase rapidly from the 1970 level of 2.1 million cbm to 12.3 million cbm in 2000. Although only 3.8 million cbm should be required for domestic consumption in 1980, the potential supply from the plantation forests is already somewhat greater. The Working Party has estimated a potential physical availability in 1980 of 5.1 million cbm which could be harvested in 1980 should costs and market conditions be attractive.

Oceania is expected to follow the pattern of developed market economies regarding utilization of mill residuals. Mill residuals are expected to provide about 40% of the region's softwood pulpwood supply in the 1980-2000 period. To attain this projected supply level, the share of residuals reused will have to increase markedly. Compared with an estimated 35% in 1960 and 55% in 1980, the region will be reusing about 71% of its residuals by 2000 if the Working Party's assessment is correct.

7.1.2 OUTLOOK FOR HARDWOODS

7.1.2.1 DEMAND OUTLOOK

Demand for hardwoods in Oceania is also expected to increase markedly, but only because of an expected growth of this subregion's pulp sector. Table 7.1.2.1 shows that domestic sawlog consumption is actually expected to decline from 7.6 million cbm in 1970 to 6.7 million cbm in 2000. The rapid decline of hardwood sawnwood production in Australia, the major producing country, should be largely offset by production increases in other Pacific Islands, notably Papua – New Guinea. During this period, in fact, a small increase in overall sawlog supply is projected. Thus, net exports of hardwood sawlogs should rise rapidly reaching almost 2.0 million cbm by 2000. Hardwood pulpwood demand, by comparison, is expected to double each decade between 1980 and 2000, reaching 4.4 million cbm by the turn of the century.

7.1.2.2 SUPPLY OUTLOOK

Overall supply of hardwoods in Oceania should increase, although supply from the largest producer, Australia, is expected to decline. Table 7.1.1.2 shows that hardwood sawlog supply in 1980 is estimated at 8.0 million cbm growing to 8.6 million cbm in 2000. Hardwood sawlog availability is expected to exceed demand in the region leading to net log exports of 0.9 million cbm in 1980 growing to 1.9 million cbm by 2000. This log export availability is based on a sawlog production projected on the assumption that economic pressure represented by Japan's demand for hardwood sawlogs will create conditions favoring additional production.

The pulpwood outlook for Oceania primarily relates to the supply prospects of Australia and Papua – New Guinea. Table 7.1.1.2 shows the Working Party's estimate of 4.4 million cbm only in 2000 for the domestic consumption of hardwood fiber logs. Hardwood mill residuals should provide the balance of the region's requirements for domestic use. The Working Party has assumed, however, that Japan's emerging pulpwood shortfall - if it materializes - will place significant pressure on the hardwood stands of Papua - New Guinea. Australia does not project that its hardwood pulpwood harvest will increase significantly but there does exist a physical potential to increase the supply of eucalyptus above the estimated level of 9.4 million cbm should that prove economical. Most of the balance of the region's 11.3 million cbm is projected to come from Papua - New Guinea. Thus, Oceania is expected in 2000 to supply 6.9 million cbm of Japan's 22.8 million cbm shortfall of hardwood pulpwood. As noted in Phase IV, this Japanese shortfall could well end up being overstated for the year 2000, but if it does emerge, Oceania should still provide a significant portion of Japan's imports and could then perhaps supply a greater proportion of Japan's pulp requirements.

7.2 MIDDLE EAST AND NORTH AFRICA

7.2.1 OUTLOOK FOR SOFTWOODS

7.2.1.1 DEMAND OUTLOOK

The Middle East and North Africa sub-region consumes a minimal amount of softwood fiber. Consumption of less than 1.0 million cbm in 1980 should barely reach 2.0 million cbm in 2000. Table 7.2.1.1 shows that pulpwood should constitute most of the region's growth in consumption because of a projected pulp mill project after 1990. Sawlogs, however, are still expected to represent about 55% of total softwood fiber consumed in 2000.

7.2.1.2 SUPPLY OUTLOOK

The Middle East and North Africa sub-region is expected to be 100% self-sufficient for its softwood fiber during the forecast period. Plantations in Algeria and Morocco should begin augmenting the sub-region's softwood supplies by 1990. The Working Party has estimated that sufficient supply should be available from sawmill residuals, commercial thinnings of North Africa's plantations and the half million hectares of natural forest to provide the basis for a small local pulp industry of the 1990's. The natural forests of Afghanistan could also become a supply source before the turn of the century.

7.2.2 OUTLOOK FOR HARDWOODS

7.2.2.1 DEMAND OUTLOOK

The future of the Middle East and North Africa sub-region's hardwood consumption should be heavily dictated by events in Iran. The country's preliminary steps to form a pulp and paper industry near the Caspian Sea should within two decades create a multi-million cbm demand for pulpwood. Because of recent political and social changes in Iran, however, this potential growth could be affected. Besides the potential of Iran, other countries in the region could well expand their hardwood fiber consumption exponentially within the next two decades. In addition, the wood resources of Iran and other Middle East countries plus the plantations of North Africa should provide the basis for developing a solidwood panel industry.

7.2.2.2 SUPPLY OUTLOOK

This sub-region's supply during the next two decades could expand. Iran has the potential to expand forest activity from its current operating base. Its harvest of industrial roundwood in recent years has been in the 4-5 million cbm range, and could increase particularly with plantations. Indigenous hardwood forest in other Middle East countries as well as some North African plantations, however, will be available to augment whatever supply Iran does produce.

7.3 AFRICA SOUTH OF THE SAHARA

7.3.1 OUTLOOK FOR SOFTWOODS

7.3.1.1 DEMAND OUTLOOK

Consumption of softwood products should more than double in Africa South of the Sahara between 1980 and 2000. Table 7.3.1.1 shows that sawlogs are expected to gradually lose share of softwood logs consumed, falling from 69% in 1960 to an estimated 52% in 1980 and 45% by 2000. Mill residuals are expected to fill an insignificant portion of the sub-region's fiber log demand which is expected to rise from 3.0 million cbm to 7.2 million cbm in the 1980-2000 period.

7.3.1.2 SUPPLY OUTLOOK

FAO has estimated that potential softwood supplies in Africa South of the Sahara will rise from 10.7 million cbm in 1980 to 16.6 million cbm by 2000. These estimates are based on a country-by-country assessment of plantations which are expected to yield 98% of this sub-region's softwood industrial roundwood by 2000. Much of the potential is still in the Union of South Africa, which potentially could produce about 7.0 million cbm by 2000. The bulk of this potential, however, is projected to be increased in East Africa (Kenya, Madagascar, Malawi, Mozambique and Tanzania), which could raise its production from 2.1 million cbm to 5.8 million cbm during the 1980-2000 period. Minor potential increases are also available in Central and West Africa, particularly Angola, Gabon and the Ivory Coast.

This sub-region, however, is not expected to harvest its full potential during the next two decades. The Working Party's estimated production for 1980 of 6.3 million cbm is well below the estimated 10.7 million cbm for that year. By 2000 the Working Party has estimated that the region will supply 13.0 million cbm, but an additional 3.6 million cbm of pulpwood is potentially available at that time. The reader should observe, however, that some of this potential supply is widely scattered and remote from tidewater, which has led the Working Party to discount the utilization of the potential from fiber log plantations. The sub-region is expected to remain 100% self-sufficient in its supply for both sawlogs and pulpwood.

7.3.2 OUTLOOK FOR HARDWOODS

7.3.2.1 DEMAND OUTLOOK

Demand for hardwoods from Africa South of the Sahara should remain very strong throughout the forecast period. The Working Party expects that growth in domestic consumption plus a modest export program for solidwood products will increase sawlog production to 24.6 million cbm by the end of this century. Table 7.3.2.1 shows that domestic sawlog consumption is expected to rise from 9.2 million cbm in 1980 to 16.9 million cbm by 2000, a 3.1% annualized increase. Because of a sustained demand in Western Europe for hardwood sawlogs, however, any surplus generated within the region should be marketable, if the species and qualities are acceptable

Consumption of fiber logs is also expected to grow, primarily because of the projected growth of an export pulp industry. Compared with 2.3 million cbm in 1980, consumption of hardwood fibers for pulping should rise to about 9.8 million cbm by 2000. As noted in Phase IV exports of fiber in the form of pulp are expected to rise from 1.0 million cbm in 1980 to 7.1 million cbm by 2000. Thus of this region's projected 7.5 million cbm incremental hardwood fiber for pulp in the 1980-2000 period, about 6.1 million cbm is destined for export.

7.3.2.2 SUPPLY OUTLOOK

The industrial roundwood potential of this sub-region is very great. It contains vast stands of mixed tropical hardwoods which represent a physical but typically uneconomical resource for world markets. FAO has estimated the potential supply increment from the logical development of its natural forest and plantations. FAO projects the 1980-2000 supply increment to be around 13 million cbm, of which about 7.5 million cbm would come from natural forests and 5.5 million cbm from plantations. This supply increment should permit gaining the estimated year 2000 sawlog harvest which is estimated at 24.6 million cbm, up from an estimated 13.7 million cbm in 1980.

The reader should note from Table 7.3.1.2 that the Working Party's estimates of hardwood supply in 1970 fall significantly below that of FAO. This implies that the Working Party may not correctly have estimated historical supply. There are two areas where this supply calculation may have led to an underestimate, domestic conversion factors and exports. The domestic sawlog consumption is calculated to be 6.1 million cbm vs. FAO's reported basis of 8.4 million cbm. Perhaps the sawmill conversion ratios are less efficient than the 60%

recovery factor which has been assumed. The second is net exports which have been adjusted downward from 6.7 million cbm to match Europe's reported net imports. Perhaps Western Europe has under-reported its supply of imported hardwood sawlogs.

The overall outlook for exports of hardwood sawlogs from Africa hinges on domestic needs and supply, and on industrial development and export policies. The Working Party's projections for wood products consumption and domestic log conversion are definitely speculative. The detailed assessment by FAO of potential supply is far more definitive and should form a realistic view of the region's sawlog potential. It seems reasonable to expect that a continuing supply of tropical hardwood logs in the range of 5 million cbm will be available for export through 1990. Whether the further sawlog supply increment which is projected for the 1990-2000 period will be available for export customers in log form appears less certain because some countries appear to be moving toward export restrictions or outright embargoes for hardwood logs.

The outlook for fiber logs is complicated by the issue of mixed tropical hardwoods from natural forests vs. plantations. FAO's assessment of the region's pulpwood potential from plantations is that 6.5 million cbm only will be added to the supply in the 1980-2000 period. Table 7.3.1.2, however, shows that another 11.6 million cbm of fiber logs will be needed to supply the perceived growth in export pulp markets. As noted in Phase IV, the pulp mill capacity projected for Africa in the 1980-2000 period is highly speculative. The underlying assumption is that capital funds will be made available at highly attractive rates to foster the development of an export industry which otherwise would tend to be uneconomical. Clearly some of these funds would need to be applied to pulping mixed tropical hardwoods; such investments may be marginal compared with opportunities presented by other areas. Should these funds not be forthcoming, the postualted white pulp capacity could readily be installed in other sub-regions where fiber and infrastructure costs provide more attractive opportunities.

7.4 FAR EAST

7.4.1 OUTLOOK FOR SOFTWOODS

7.4.1.1 DEMAND OUTLOOK

Demand for softwood in the Far East region is projected to increase from an estimated 5.7 million cbm in 1980 to 14.5 million cbm in 2000. Some localized growth in the consumption of softwood lumber is expected but the bulk of this demand should be for the pulp and paper industry. Table 7.4.1.1 shows that the consumption of sawlogs is expected to drop from 82% of logs consumed domestically in 1980 to 59% by 2000.

7.4.1.2 SUPPLY OUTLOOK

The supply of softwoods should increase primarily due to the plantation programs being carried out in South Asia and East Asia. South Asia's supply should increase by roughly 5.0 million cbm between 1980 and 2000, via further development of the natural forests and plantations in India and Pakistan. Supply in East Asia is projected to increase by 6.6 million cbm during that period as the plantations of Korea are harvested. In addition Insular Southeast Asia should generate at least 2.0 million cbm by year 2000. The Working Party estimates that this supply will be increasingly in the form of pulpwood and that the availability of softwood pulpwood will increase from an estimated 1.2 million cbm in 1980 to 11.2 million cbm in 2000. It is expected that the use of residuals from softwood sawlogs will improve and the fiber supply from softwood residuals will grow from an estimated 0.6 million cbm in 1980 to 1.4 million cbm in 2000.

Softwood sawlog self-sufficiency is expected to increase from the estimated 1980 level of 79% to 84% in 2000. Domestic production should increase by 3.4 million cbm with the growth of United States log imports into the Republic of Korea tapering off after the mid-1980's.

The Working Party has estimated that softwood pulpwood self-sufficiency will increase dramatically after 1990 rising from 120% in that year to 187% in 2000. Table 7.4.1.2 shows that exports of 5.2 million cbm are projected by the end of the century, up from a modest 0.5 million cbm in 1990. The Working Party has serious reservations about this forecast which implies that softwood pulpwood will be shipped to Japan not only from Insular Southeast Asia but also South and East Asia as well. Based on the Working Party's pulp production forecast for the region, the 5.2 million cbm of pulpwood which is projected for export should be physically available for shipment in pulpwood form to Japan. The Working Party believes, however, that political and economic pressures may well dictate that some of this fiber is converted to chemical pulp within the countries of origin and then shipped within the Far East. It notes that Table 7.0.4.1 of Phase IV shows a softwood pulp deficit amount to 3.4 million cbm of pulpwood equivalence. Thus the region might well be more self-sufficient in softwood pulps than Phase IV has assumed with less softwood pulpwood available for Japan.

7.4.2 OUTLOOK FOR HARDWOODS

7.4.2.1 DEMAND OUTLOOK

Consumption of industrial hardwood roundwood in the Far East is roughly ten times that of softwood. Demand is expected to continue increasing at an annualized rate of 3.8% during the next two decades. By year 2000 the Far East's consumption of industrial hardwood roundwood is expected to represent almost 18% of the world total, up from 13% in 1980.

A rapid growth is anticipated in wood conversion facilities, primarily sawmills and plywood mills to feed an increased local demand as well as export demand, as described in Phase IV. The consumption of sawlogs is expected to grow from an anticipated 45.2 million cbm in 1980 to 97.5 million cbm in 2000. The Working Party has been forced to adjust downwards the original sawlog consumption projections and increase the supply projections in order to bring these figures into balance. These adjustments are believed reasonable given the assumption that the impending shortage of supply of the better known species of the South East Asian forest will force prices up thereby restraining local demand on the one hand and encouraging better utilization of the hitherto less well known or less economical species. Furthermore, it is expected that this price increase could be all the more dramatic in the 1980's in view of the present overcapacity and depressed state of the hardwood plywood industry within the region and in Japan.

The projected increased consumption of fiber logs arises primarily from the Working Party's forecast of pulp production for export. To match Japan's perceived hardwood pulp shortfall in year 2000, the Working Party has postulated a significant pulp export business from the Far East. The fiber component of these exports is estimated at 6.7 million cbm by 2000, equivalent to 16% of Japan's hardwood fiber in pulp products. Domestic consumption of hardwood pulps should still at least triple (up from 3.1 to 10.1 million cbm during that period), but exports represent almost half of the potential demand.

7.4.2.2 SUPPLY OUTLOOK

The Working Party has cooperated closely with FAO in developing the log supply estimates for the Far East. Several Working Party members are representatives from forestry departments within the Far East. FAO's detailed country-by-country assessment for the Far East has effectively been a joint effort with the Working Party for the key producing countries.

Within the Far East only India and Indonesia are expected to increase their production of hardwood sawlogs significantly. Some traditional suppliers such as Malaysia are projected to decrease their production whereas others such as the Philippines and Thailand are expected to have a relatively stable supply.

Supply from the Far East region's hardwood forests will depend largely on the policies of governments. With increasing realization that the high quality sawlogs presently being harvested are in many ways a non-renewable resource, more conservative policies are anticipated, especially in South East Asia. This expectation has entered into the Working Party's calculations of supply. As a result, the Working Party has assumed a far greater acceptance of lesser known species in the projected supply of hardwood sawlogs within the Far East after 1980.

Thus traditional sawlog species are projected to represent a lower share of the estimated 106.7 million cbm in 2000 than they are expected to be in the 64.6 million cbm estimated for 1980.

The self-sufficiency in sawlogs should decline from an estimated 143% in 1980 to 109% in 2000 with exports falling from 19.4 million cbm to 9.2 million cbm in that period. This export figure for the year 2000 does not represent the region's surplus over the material naturally required for domestic consumption. It is instead the Working Party's estimate of how much sawlog quality material will enter into export in log form. This is, of course, related to the expected demand which countries outside of the sub-region, primarily Japan, will place on the timber base. Producers in these countries are expected to outbid the local Far Eastern conversion industries where the sawlogs originated in order to attract this material into export in log form.

The outlook for fiber log supply has been developed recognizing the relative abundance of the region's hardwood resources. Concentrations of logs suitable for chipping exist, for example, along the rivers of Kalimantan and in New Guinea. High growth forests, such as the falcata plantations of the Philippines, also promise to rapidly expand the supply of fiber logs within the Far East. In addition, local converting of sawlogs will create a massive growth of mill residuals which should supply almost 8.0 million cbm or 27% of the Far East's pulpwood by 2000.

TABLE 7.0.1.1

OTHER EASTERN HEMISPHERE

ESTIMATED DEMAND ON THE FOREST FOR INDUSTRIAL SOFTWOOD

(Millions of Cubic Meters)

Sawlog Demand	1960	1970	1980	1990	2000
Sawnwood & Sleepers					
Product Volume	4.3	6.5	8.3	11.1	16.9
Residuals Created	4.6	6.5	8.3	10.8	16.9
Gross Wood-in-the-Rough	8.9	13.0	16.6	21.9	33.8
Solidwood Panels					
Product Volume	-	-	0.1	0.1	0.2
Residuals Created	-	-	0.1	0.1	0.2
Gross Wood-in-the-Rough	-	-	0.2	0.2	0.4
Dom. Sawlog Demand	8.9	13.0	16.8	22.1	34.2
Sawlog Trade-Exp(Imp)	0.3	1.3	0.9	1.5	5.2
Total Sawlog Demand	9.2	14.3	17.7	23.6	39.4
Fiberlog Demand					
Reconstituted Panels	0.2	0.7	1.6	1.9	2.3
Other Ind. Roundwood	1.2	1.5	1.8	1.9	2.2
Pulp	1.8	4.9	7.9	15.7	30.8
Subtotal Demand	3.2	7.1	11.3	19.5	35.3
Less: Residuals Reused Domestically	1.2	1.7	3.3	5.3	9.2
Net Dom. Fiberlog Demand	2.0	5.4	8.0	14.2	26.1
Fiberlog Trade-Exp(Imp)	-	-	0.2	2.2	5.5
Total Fiberlog Demand	2.0	5.4	8.2	16.4	31.6
TOTAL DEMAND FOR INDUSTRIAL SOFTWOODS	11.2	19.7	25.9	40.0	71.0

TABLE 7.0.2.1

OTHER EASTERN HEMISPHERE

ESTIMATED DEMAND ON THE FOREST FOR INDUSTRIAL HARDWOOD

(Millions of Cubic Meters)

Sawlog Demand	1960	1970	1980	1990	2000
Sawnwood & Sleepers					
Product Volume	12.8	18.3	25.4	42.5	54.2
Residuals Created	11.9	16.3	19.8	28.0	35.2
Gross Wood-in-the-Rough	24.7	34.6	45.3	70.6	89.5
Solidwood Panels					
Product Volume	0.9	3.1	8.3	13.8	17.5
Residuals Created	1.3	4.2	9.3	13.8	17.9
Gross Wood-in-the-Rough	2.2	7.3	17.6	27.5	35.4
Dom. Sawlog	26.9	41.9	62.9	98.1	124.9
Sawlog Trade-Exp(Imp)	10.5	26.4	24.8	19.0	18.8
Total Sawlog Demand	37.4	68.3	87.7	117.1	143.7
Fiberlog Demand					
Reconstituted Panels	0.4	1.2	1.7	2.3	3.7
Other Ind. Roundwood	27.9	32.5	35.9	37.5	40.1
Pulp	0.6	2.7	7.0	16.2	36.5
Subtotal Demand	28.9	36.4	44.6	56.0	80.3
Less: Residuals Reused Domestically	1.1	1.6	4.4	8.1	10.4
Net Dom. Fiberlog Demand	27.8	34.8	40.2	47.9	69.9
Fiberlog Trade-Exp(Imp)	0.1	0.4	5.8	15.2	22.6
Total Fiberlog Demand	27.9	35.2	46.0	63.1	92.5
TOTAL DEMAND FOR INDUSTRIAL HARDWOODS	65.3	103.5	133.7	180.2	236.2

TABLE 7.0.1.2

OTHER EASTERN HEMISPHERE
ESTIMATED SUPPLY AND SELF-SUFFICIENCY TRENDS
FOR INDUSTRIAL ROUNDWOOD

(Millions of Cubic Meters)

Softwoods	1960	1970	1980	1990	2000
Sawlogs					
Domestic Supply	9.2	14.3	17.7	23.6	39.4
Net Imports (Exports)	(0.3)	(1.3)	(0.9)	(1.5)	(5.2)
Sawlogs Consumed	8.9	13.0	16.8	22.1	34.2
Residuals Reused					
Domestic Supply	1.2	1.7	3.3	5.3	9.2
Net Imports (Exports)	-	-	-	-	-
Residuals Supplied	1.2	1.7	3.3	5.3	9.2
Fiber Logs					
Domestic Supply	2.0	5.4	8.2	16.4	31.6
Net Imports (Exports)	-	-	(0.2)*	(2.2)*	(5.5)*
Fiber Logs Consumed	2.0	5.4	8.0	14.2	26.1
Softwood Logs Supplied	11.2	19.7	25.9	40.0	71.0
FAO Report Basis		20.2			
Hardwoods					
Sawlogs					
Domestic Supply	37.4	68.3	87.7	117.1	143.7
Net Imports (Exports)	(10.5)	(26.4)	(24.8)	(19.0)	(18.8)
Sawlogs Consumed	26.9	41.9	62.9	98.1	124.9
Residuals Reused					
Domestic Supply	1.1	1.6	4.4	8.1	10.4
Net Imports (Exports)	-	-	-	-	-
Residuals Supplied	1.1	1.6	4.4	8.1	10.4
Fiber Logs					
Domestic Supply	27.9	35.2	46.0	63.1	92.5
Net Imports (Exports)	(0.1)	(0.4)	(5.8)*	(15.2)*	(22.6)*
Fiber Logs Consumed	27.8	34.8	40.2	47.9	69.9
Hardwood Logs Supplied	65.3	103.5	133.7	180.2	236.2
FAO Report Basis		112.8			
TOTAL LOGS SUPPLIED	76.5	123.2	159.6	220.2	307.2

TABLE 7.1.1.1

OCEANIA

ESTIMATED DEMAND ON THE FOREST FOR INDUSTRIAL SOFTWOOD

(Millions of Cubic Meters)

Sawlog Demand	1960	1970	1980	1990	2000
Sawnwood & Sleepers					
Product Volume	2.3	2.7	3.3	4.3	8.0
Residuals Created	3.1	3.7	4.6	5.8	10.4
Gross Wood-in-the-Rough	5.4	6.4	7.9	10.1	18.4
Solidwood Panels					
Product Volume	-	-	0.1	0.1	0.2
Residuals Created	-	-	0.1	0.1	0.2
Gross Wood-in-the-Rough	-	-	0.2	0.2	0.4
Dom. Sawlog Demand	5.4	6.4	8.1	10.3	18.8
Sawlog Trade-Exp(Imp)	0.3	1.8	1.9	2.7	6.6
Total Sawlog Demand	5.7	8.2	10.0	13.0	25.4
Fiberlog Demand					
Reconstituted Panels	0.1	0.6	1.4	1.7	2.0
Other Ind. Roundwood	0.1	0.4	0.5	0.4	0.4
Pulp	1.4	2.5	4.5	8.3	17.1
Subtotal Demand	1.6	3.5	6.4	10.4	19.5
Less: Residuals Reused Domestically	1.1	1.4	2.6	3.9	7.5
Net Dom. Fiberlog Demand	0.5	2.1	3.8	6.5	12.0
Fiberlog Trade-Exp(Imp)	-	-	-	1.7	0.3
Total Fiberlog Demand	0.5	2.1	3.8	8.2	12.3
TOTAL DEMAND FOR INDUSTRIAL SOFTWOODS	6.2	10.3	13.8	21.2	37.7

TABLE 7.1.2.1

OCEANIA

ESTIMATED DEMAND ON THE FOREST FOR INDUSTRIAL HARDWOOD

(Millions of Cubic Meters)

Sawlog Demand	1960	1970	1980	1990	2000
Sawnwood & Sleepers					
Product Volume	3.1	2.9	2.7	2.6	2.5
Residuals Created	4.3	4.3	4.0	3.7	3.6
Gross Wood-in-the-Rough	7.4	7.2	6.7	6.3	6.1
Solidwood Panels					
Product Volume	0.1	0.2	0.2	0.3	0.3
Residuals Created	0.1	0.2	0.2	0.3	0.3
Gross Wood-in-the-Rough	0.2	0.4	0.4	0.6	0.6
Dom. Sawlog	7.6	7.6	7.1	6.9	6.7
Sawlog Trade-Exp(Imp)	(0.3)	0.3	0.9	1.5	1.9
Total Sawlog Demand	7.3	7.9	8.0	8.4	8.6
Fiberlog Demand					
Reconstituted Panels	0.2	0.2	0.3	0.3	0.3
Other Ind. Roundwood	0.9	0.7	0.7	0.6	0.6
Pulp	0.4	0.6	0.8	2.3	5.0
Subtotal Demand	1.5	1.5	1.8	3.2	5.9
Less: Residuals Reused Domestically	0.4	0.4	0.9	1.2	1.5
Net Dom. Fiberlog Demand	1.1	1.1	0.9	2.0	4.4
Fiberlog Trade-Exp(Imp)	-	-	2.8	5.1	6.9
Total Fiberlog Demand	1.1	1.1	3.7	7.1	11.3
TOTAL DEMAND FOR INDUSTRIAL HARDWOODS	8.4	9.0	11.7	15.5	19.9

TABLE 7.1.1.2

OCEANIA

ESTIMATED SUPPLY AND SELF-SUFFICIENCY TRENDS FOR INDUSTRIAL ROUNDWOOD

(Millions of Cubic Meters)

Softwoods	1960	1970	1980	1990	2000
Sawlogs					
Domestic Supply	5.7	8.2	10.0	13.0	25.4
Net Imports (Exports)	(0.3)	(1.8)	(1.9)	(2.7)	(6.6)*
Sawlogs Consumed	5.4	6.4	8.1	10.3	18.8
Residuals Reused					
Domestic Supply	1.1	1.4	2.6	3.9	7.5
Net Imports (Exports)	-	-	-	-	-
Residuals Supplied	1.1	1.4	2.6	3.9	7.5
Fiber Logs					
Domestic Supply	0.5	2.1	3.8	8.2	12.3
Net Imports (Exports)	-	-	-	(1.7)	(0.3)
Fiber Logs Consumed	0.5	2.1	3.8	6.5	12.0
Softwood Logs Supplied	6.2	10.3	13.8	21.2	37.7
FAO Report Basis		10.3			
Hardwoods					
Sawlogs					
Domestic Supply	7.3	7.9	8.0	8.4	8.6
Net Imports (Exports)	0.3	(0.3)	(0.9)	(1.5)	(1.9)
Sawlogs Consumed	7.6	7.6	7.1	6.9	6.7
Residuals Reused					
Domestic Supply	0.4	0.4	0.9	1.2	1.5
Net Imports (Exports)	-	-	-	-	-
Residuals Supplied	0.4	0.4	0.9	1.2	1.5
Fiber Logs					
Domestic Supply	1.1	1.1	3.7	7.1	11.3
Net Imports (Exports)	-	-	(2.8)*	(5.1)*	(6.9)*
Fiber Logs Consumed	1.1	1.1	0.9	2.0	4.4
Hardwood Logs Supplied	8.4	9.0	11.7	15.5	19.9
FAO Report Basis		10.0			
TOTAL LOGS SUPPLIED	14.6	19.3	25.5	36.7	57.6

TABLE 7.2.1.1

MIDDLE EAST AND NORTH AFRICA

ESTIMATED DEMAND ON THE FOREST FOR INDUSTRIAL SOFTWOOD

(Millions of Cubic Meters)

Sawlog Demand	1960	1970	1980	1990	2000
Sawnwood & Sleepers					
Product Volume	0.3	0.4	0.4	0.5	0.7
Residuals Created	0.3	0.3	0.3	0.4	0.4
Gross Wood-in-the-Rough	0.6	0.7	0.7	0.9	1.1
Solidwood Panels					
Product Volume	-	-	-	-	-
Residuals Created	-	-	-	-	-
Gross Wood-in-the-Rough	-	-	-	-	-
Dom. Sawlog Demand	0.6	0.7	0.7	0.9	1.1
Sawlog Trade-Exp(Imp)	-	(0.2)	-	-	-
Total Sawlog Demand	0.6	0.5	0.7	0.9	1.1
Fiberlog Demand					
Reconstituted Panels	-	-	-	-	-
Other Ind. Roundwood	0.2	0.2	0.2	0.2	0.2
Pulp	-	-	-	-	0.8
Subtotal Demand	0.2	0.2	0.2	0.2	1.0
Less: Residuals Reused Domestically	-	-	-	-	0.1
Net Dom. Fiberlog Demand	0.2	0.2	0.2	0.2	0.9
Fiberlog Trade-Exp(Imp)	-	-	-	-	-
Total Fiberlog Demand	0.2	0.2	0.2	0.2	0.9
TOTAL DEMAND FOR INDUSTRIAL SOFTWOODS	0.8	0.7	0.9	1.1	2.0

TABLE 7.2.2.1

MIDDLE EAST AND NORTH AFRICA

ESTIMATED DEMAND ON THE FOREST FOR INDUSTRIAL HARDWOOD

(Millions of Cubic Meters)

Sawlog Demand	1960	1970	1980	1990	2000
Sawnwood & Sleepers					
Product Volume	0.1	0.3	0.2	0.2	0.2
Residuals Created	0.1	0.2	0.1	0.1	0.1
Gross Wood-in-the-Rough	0.2	0.5	0.4	0.3	0.3
Solidwood Panels					
Product Volume	-	0.2	0.4	1.1	1.6
Residuals Created	0.1	0.3	0.6	1.4	1.9
Gross Wood-in-the-Rough	0.1	0.5	1.0	2.5	3.5
Dom. Sawlog	0.3	1.0	1.4	2.8	3.8
Sawlog Trade-Exp(Imp)	(0.2)	(0.2)	-	-	-
Total Sawlog Demand	0.1	0.8	1.4	2.8	3.8
Fiberlog Demand					
Reconstituted Panels	-	0.3	0.3	0.5	0.9
Other Ind. Roundwood	5.6	5.8	6.2	6.2	6.2
Pulp	0.1	0.2	0.8	2.2	4.9
Subtotal Demand	5.7	6.3	7.3	8.9	12.0
Less: Residuals Reused Domestically	-	-	0.1	0.2	0.3
Net Dom. Fiberlog Demand	5.7	6.3	7.2	8.7	11.7
Fiberlog Trade-Exp(Imp)	-	-	-	-	-
Total Fiberlog Demand	5.7	6.3	7.2	8.7	11.7
TOTAL DEMAND FOR INDUSTRIAL HARDWOODS	5.8	7.1	8.6	11.5	15.5

TABLE 7.2.1.2
MIDDLE EAST AND NORTH AFRICA
ESTIMATED SUPPLY AND SELF-SUFFICIENCY TRENDS
FOR INDUSTRIAL ROUNDWOOD

(Millions of Cubic Meters)

Softwoods	1960	1970	1980	1990	2000
Sawlogs					
Domestic Supply	0.6	0.5	0.7	0.9	1.1
Net Imports (Exports)	-	0.2	-	-	-
Sawlogs Consumed	0.6	0.7	0.7	0.9	1.1
Residuals Reused					
Domestic Supply	-	-	-	-	0.1
Net Imports (Exports)	-	-	-	-	-
Residuals Supplied	-	-	-	-	0.1
Fiber Logs					
Domestic Supply	0.2	0.2	0.2	0.2	0.9
Net Imports (Exports)	-	-	-	-	-
Fiber Logs Consumed	0.2	0.2	0.2	0.2	0.9
Softwood Logs Supplied	0.8	0.7	0.9	1.1	2.0
FAO Report Basis		1.0			
Hardwoods					
Sawlogs					
Domestic Supply	0.1	0.8	1.4	2.8	3.8
Net Imports (Exports)	0.2	0.2	-	-	-
Sawlogs Consumed	0.3	1.0	1.4	2.8	3.8
Residuals Reused					
Domestic Supply	-	-	0.1	0.2	0.3
Net Imports (Exports)	-	-	-	-	-
Residuals Supplied	-	-	0.1	0.2	0.3
Fiber Logs					
Domestic Supply	5.7	6.3	7.2	8.7	11.7
Net Imports (Exports)	-	-	-	-	-
Fiber Logs Consumed	5.7	6.3	7.2	8.7	11.7
Hardwood Logs Supplied	5.8	7.1	8.6	11.5	15.5
FAO Report Basis		6.7			
TOTAL LOGS SUPPLIED	6.6	7.8	9.5	12.6	17.5

TABLE 7.3.1.1

AFRICA SOUTH OF THE SAHARA

ESTIMATED DEMAND ON THE FOREST FOR INDUSTRIAL SOFTWOOD

(Millions of Cubic Meters)

Sawlog Demand	1960	1970	1980	1990	2000
Sawnwood & Sleepers					
Product Volume	0.7	1.4	2.0	2.8	3.5
Residuals Created	0.5	0.9	1.3	1.8	2.3
Gross Wood-in-the-Rough	1.1	2.3	3.3	4.6	5.8
Solidwood Panels					
Product Volume	-	-	-	-	-
Residuals Created	-	-	-	-	-
Gross Wood-in-the-Rough	-	-	-	-	-
Dom. Sawlog Demand	1.1	2.3	3.3	4.6	5.8
Sawlog Trade-Exp(Imp)	-	-	-	-	-
Total Sawlog Demand	1.1	2.3	3.3	4.6	5.8
Fiberlog Demand					
Reconstituted Panels	0.1	0.1	0.2	0.2	0.3
Other Ind. Roundwood	0.1	0.1	0.2	0.2	0.2
Pulp	0.3	2.1	2.7	4.9	6.9
Subtotal Demand	0.5	2.3	3.1	5.3	7.4
Less: Residuals Reused Domestically	-	0.1	0.1	0.2	0.2
Net Dom. Fiberlog Demand	0.5	2.2	3.0	5.1	7.2
Fiberlog Trade-Exp(Imp)	-	-	-	-	-
Total Fiberlog Demand	0.5	2.2	3.0	5.1	7.2
TOTAL DEMAND FOR INDUSTRIAL SOFTWOODS	1.6	4.5	6.3	9.7	13.0

TABLE 7.3.2.1

AFRICA SOUTH OF THE SAHARA

ESTIMATED DEMAND ON THE FOREST FOR INDUSTRIAL HARDWOOD

(Millions of Cubic Meters)

Sawlog Demand	1960	1970	1980	1990	2000
Sawnwood & Sleepers					
Product Volume	1.8	2.9	4.2	5.7	7.2
Residuals Created	1.2	2.0	2.8	3.8	4.8
Gross Wood-in-the-Rough	3.1	4.9	7.0	9.6	12.0
Solidwood Panels					
Product Volume	0.2	0.6	1.1	1.9	2.4
Residuals Created	0.2	0.6	1.1	2.0	2.5
Gross Wood-in-the-Rough	0.3	1.2	2.2	3.9	4.9
Dom. Sawlog	3.4	6.1	9.2	13.5	16.9
Sawlog Trade-Exp(Imp)	4.7	4.0	4.5	5.2	7.7
Total Sawlog Demand	8.1	10.1	13.7	18.7	24.6
Fiberlog Demand					
Reconstituted Panels	0.1	0.4	0.7	1.1	1.9
Other Ind. Roundwood	11.6	15.5	17.8	19.1	21.0
Pulp	-	1.4	2.3	4.7	9.8
Subtotal Demand	11.7	17.3	20.8	24.9	32.7
Less: Residuals Reused Domestically	0.1	0.2	0.4	0.6	0.7
Net Dom. Fiberlog Demand	11.6	17.1	20.4	24.3	32.0
Fiberlog Trade-Exp(Imp)	-	-	-	-	-
Total Fiberlog Demand	11.6	17.1	20.4	24.3	32.0
TOTAL DEMAND FOR INDUSTRIAL HARDWOODS	19.7	27.2	34.1	43.0	56.6

TABLE 7.3.1.2
AFRICA SOUTH OF THE SAHARA
ESTIMATED SUPPLY AND SELF-SUFFICIENCY TRENDS FOR INDUSTRIAL ROUNDWOOD

(Millions of Cubic Meters)

Softwoods	1960	1970	1980	1990	2000
Sawlogs					
Domestic Supply	1.1	2.3	3.3	4.6	5.8
Net Imports (Exports)	-	-	-	-	-
Sawlogs Consumed	1.1	2.3	3.3	4.6	5.8
Residuals Reused					
Domestic Supply	-	0.1	0.1	0.2	0.2
Net Imports (Exports)	-	-	-	-	-
Residuals Supplied	-	0.1	0.1	0.2	0.2
Fiber Logs					
Domestic Supply	0.5	2.2	3.0	5.1	7.2
Net Imports (Exports)	-	-	-	-	-
Fiber Logs Consumed	0.5	2.2	3.0	5.1	7.2
Softwood Logs Supplied	1.6	4.5	6.3	9.7	13.0
FAO Report Basis		5.6			
Hardwoods					
Sawlogs					
Domestic Supply	8.1	10.1	13.7	18.7	24.6
Net Imports (Exports)	(4.7)	(4.0)	(4.5)	(5.2)*	(7.7)*
Sawlogs Consumed	3.4	6.1	9.2	13.5	16.9
Residuals Reused					
Domestic Supply	0.1	0.2	0.4	0.6	0.7
Net Imports (Exports)	-	-	-	-	-
Residuals Supplied	0.1	0.2	0.4	0.6	0.7
Fiber Logs					
Domestic Supply	11.6	17.1	20.4	24.3	32.0
Net Imports (Exports)	-	-	-	-	-
Fiber Logs Consumed	11.6	17.1	20.4	24.3	32.0
Hardwood Logs Supplied	19.7	27.2	34.1	43.0	56.6
FAO Report Basis		32.9			
TOTAL LOGS SUPPLIED	21.3	31.7	40.4	52.7	69.6

TABLE 7.4.1.1

FAR EAST

ESTIMATED DEMAND ON THE FOREST FOR INDUSTRIAL SOFTWOOD

(Millions of Cubic Meters)

Sawlog Demand	1960	1970	1980	1990	2000
Sawnwood & Sleepers					
Product Volume	1.0	2.0	2.6	3.5	4.7
Residuals Created	0.8	1.6	2.1	2.8	3.8
Gross Wood-in-the-Rough	1.8	3.6	4.7	6.3	8.5
Solidwood Panels					
Product Volume	-	-	-	-	-
Residuals Created	-	-	-	-	-
Gross Wood-in-the-Rough	-	-	-	-	-
Dom. Sawlog Demand	1.8	3.6	4.7	6.3	8.5
Sawlog Trade-Exp(Imp)	-	(0.3)	(1.0)	(1.2)	(1.4)
Total Sawlog Demand	1.8	3.3	3.7	5.1	7.1
Fiberlog Demand					
Reconstituted Panels	-	-	-	-	-
Other Ind. Roundwood	0.8	0.8	0.9	1.1	1.4
Pulp	0.1	0.3	0.7	2.5	6.0
Subtotal Demand	0.9	1.1	1.6	3.6	7.4
Less: Residuals Reused Domestically	0.1	0.2	0.6	1.2	1.4
Net Dom. Fiberlog Demand	0.8	0.9	1.0	2.4	6.0
Fiberlog Trade-Exp(Imp)	-	-	0.2	0.5	5.2
Total Fiberlog Demand	0.8	0.9	1.2	2.9	11.2
TOTAL DEMAND FOR INDUSTRIAL SOFTWOODS	2.6	4.2	4.9	8.0	18.3

TABLE 7.4.2.1

FAR EAST

ESTIMATED DEMAND ON THE FOREST FOR INDUSTRIAL HARDWOOD

(Millions of Cubic Meters)

Sawlog Demand	1960	1970	1980	1990	2000
Sawnwood & Sleepers					
Product Volume	7.8	12.2	18.3	34.0	44.3
Residuals Created	6.3	9.8	12.9	20.4	26.7
Gross Wood-in-the-Rough	14.1	22.0	31.2	54.4	71.1
Solidwood Panels					
Product Volume	0.6	2.1	6.6	10.5	13.2
Residuals Created	0.9	3.1	7.4	10.1	13.2
Gross Wood-in-the-Rough	1.5	5.2	14.0	20.5	26.4
Dom. Sawlog	15.6	27.2	45.2	74.9	97.5
Sawlog Trade-Exp(Imp)	6.3	22.3	19.4	12.3	9.2
Total Sawlog Demand	21.9	49.5	64.6	87.2	106.7
Fiberlog Demand					
Reconstituted Panels	0.1	0.3	0.4	0.4	0.6
Other Ind. Roundwood	9.8	10.5	11.2	11.6	12.3
Pulp	0.1	0.5	3.1	7.0	16.8
Subtotal Demand	10.0	11.3	14.7	19.0	29.7
Less: Residuals Reused Domestically	0.6	1.0	3.0	6.1	7.9
Net Dom. Fiberlog Demand	9.4	10.3	11.7	12.9	21.8
Fiberlog Trade-Exp(Imp)	0.1	0.4	3.0	10.1	15.7
Total Fiberlog Demand	9.5	10.7	14.7	23.0	37.5
TOTAL DEMAND FOR INDUSTRIAL HARDWOODS	31.4	60.2	79.3	110.2	144.2

TABLE 7.4.1.2

FAR EAST

ESTIMATED SUPPLY AND SELF-SUFFICIENCY TRENDS FOR INDUSTRIAL ROUNDWOOD

(Millions of Cubic Meters)

Softwoods	1960	1970	1980	1990	2000
Sawlogs					
Domestic Supply	1.8	3.3	3.7	5.1	7.1
Net Imports (Exports)	-	0.3	1.0	1.2	1.4
Sawlogs Consumed	1.8	3.6	4.7	6.3	8.5
Residuals Reused					
Domestic Supply	0.1	0.2	0.6	1.2	1.4
Net Imports (Exports)	-	-	-	-	-
Residuals Supplied	0.1	0.2	0.6	1.2	1.4
Fiber Logs					
Domestic Supply	0.8	0.9	1.2	2.9	11.2
Net Imports (Exports)	-	-	(0.2)	(0.5)	(5.2)
Fiber Logs Consumed	0.8	0.9	1.0	2.4	6.0
Softwood Logs Supplied	2.6	4.2	4.9	8.0	18.3
FAO Report Basis		3.3			
Hardwoods					
Sawlogs					
Domestic Supply	21.9	49.5	64.6	87.2	106.7
Net Imports (Exports)	(6.3)	(22.3)	(19.4)	(12.3)	(9.2)
Sawlogs Consumed	15.6	27.2	45.2	74.9	97.5
Residuals Reused					
Domestic Supply	0.6	1.0	3.0	6.1	7.9
Net Imports (Exports)	-	-	-	-	-
Residuals Supplied	0.6	1.0	3.0	6.1	7.9
Fiber Logs					
Domestic Supply	9.5	10.7	14.7	23.0	37.5
Net Imports (Exports)	(0.1)	(0.4)	(3.0)*	(10.1)*	(15.7)*
Fiber Logs Consumed	9.4	10.3	11.7	12.9	21.8
Hardwood Logs Supplied	31.4	60.2	79.3	110.2	144.2
FAO Report Basis		63.2			
TOTAL LOGS SUPPLIED	34.0	64.4	84.2	118.2	162.5

CENTRALLY PLANNED

8.0 CENTRALLY PLANNED ECONOMIES

8.0.1 DEMAND OUTLOOK

The Centrally Planned Economies are projected to increase their consumption of industrial roundwood from 338.2 million cbm in 1960 to 452.1 and 592.7 million cbm in 1980 and 2000 respectively. Thus consumption is expected to increase between 1980 and 2000 at an annualized rate of 1.4%, down only marginally from the 1.5% rate of the 1960-80 period. Softwoods are expected to remain the dominant species with their share holding steady throughout the forecast period in the range of 80%. Sawlogs, however, have been losing share in recent years, declining from 76% in 1960 to 72% in 1970 and an estimated 69% in 1980. This decline, however, should be arrested after 1980 with the sawlog proportion of total roundwood consumed still estimated at 69% in year 2000. Tables 8.0.1.1, 8.0.1.2 and 8.0.2.1 show the Working Party's aggregate consumption and supply estimates for the Centrally Planned Economies.

8.0.2 SUPPLY OUTLOOK

Supply from the Centrally Planned Economies is expected to differ markedly by sub-region. Eastern Europe is perceived to be already near the physical limit of its supply capability with only a 17% increment available above its estimated 1980 capability. The Soviet Union, by comparison, is expected to expand its roundwood supply by 37% or 1.6% annually during that period, with some further supply achievable should demand so dictate. Centrally Planned Asia is expected to increase its roundwood supply by 44% between 1980 and 2000, albeit from a smaller base.

The supply outlook presented in this section of the report has been partially developed by ECE/FAO and partially by the Working Party. The outlook for Eastern Europe has been compiled by ECE/FAO in the same manner as Western Europe. The outlook for the Soviet Union has been prepared by the project leader using data from ETTS III and the views of an expert on the Soviet Union's forest products industry as the basis for estimating potential supply. The outlook for Centrally Planned Asia has been developed by the Working Party coordinator for the Far East based on the discussions with experts and the two studies referred to in Phase IV. Because of the wide disagreement between these studies, however, the outlook presented for roundwood supplies from Centrally Planned Asia must be regarded as speculative.

8.1 EASTERN EUROPE

The six countries of Eastern Europe have a growing stock of about 3.9 billion cbm on an area of exploitable forest of 25 million hectares. In the mid-1970's their removals from this forest amounted to 77 million cbm a year. Two groups can be distinguished: the predominantly softwood-growing countries to the north - Poland, Czechoslovakia and the German Democratic Republic; and the countries to the south - Bulgaria, Hungary and Romania, where hardwoods account for somewhat the larger proportion.

Forest policy in Eastern Europe has been and continues to be directed towards building up the growing stock that in many areas was damaged or depleted during the second World War, as well as to raise the share of softwoods in total growing stock. Indeed, the whole of the expansion of growing stock estimated in ETTS III[1] between 1970 and 2000 of 660 million cbm is of softwoods. This increase in growing stock is being achieved by holding removals to a level well below increment, which can only partly be justified on the basis of the age-class structure of the forest. In fact, there are quite extensive areas of mature stands in some Eastern European countries. Rotation ages of these stands appear longer than the biological or financial optimum (a phenomenon not exclusive to Eastern Europe) and the volume of growing stock per hectare is nearly 50% above the European average, with Czechoslovakia and Romania approaching the very high levels in Austria and Switzerland.

Based largely on the countries' forecasts furnished for ETTS III, roundwood removals in Eastern Europe are forecast to reach 90-92 million cbm in 2000, an increase of 13-15 million cbm or 17-19% compared with the mid-1970's. Of this supply, industrial roundwood is estimated to reach 83.5 million cbm, up from an estimated 71.2 million cbm in 1980. While accepting the higher figure, the Working Party feels that this increase could be exceeded if some or all of the countries shifted to a somewhat less conservative forest policy in the coming two decades. In this connection, the above forecast of removals, after adjusting for bark and felling losses, corresponds closely with the ETTS III estimate of net annual increment in 2000 of 120 million cbm. Compared with the expected rise in growing stock, however, the above increment rate appears to be an underestimate.

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[1] European Timber Trends and Prospects, 1950 to 2000.

8.1.1 OUTLOOK FOR SOFTWOODS

8.1.1.1 DEMAND OUTLOOK

Consumption of softwood roundwood in Eastern Europe is expected to rise only marginally during the 1980-2000 period. After rising from 33.0 million cbm in 1960 to an estimated 47.0 million cbm in 1980, softwood roundwood consumption is expected to reach only 54.1 million cbm by 2000. This slowing of growth from an estimated 1.8% rate in the 1960-80 period to 0.7% between 1980 and 2000 is expected to occur because of supply limitations. As noted in Phase IV, massive imports of sawnwood, pulp and paper are perceived necessary during the next two decades to meet the region's logical growth in consumption. Recycling of residuals should exceed 60% by the turn of the century, but residuals are still only expected to represent 22% of pulpwood supply.

8.1.1.2 SUPPLY OUTLOOK

Removals of softwoods in Eastern Europe are forecast to reach 55.4 million cbm in 2000, an increase of 10.6 million cbm or 24% over the mid-1970's. Of the total, 53.2 million cbm are estimated to be industrial wood. The main volume increases are expected to occur in Poland, the German Democratic Republic and Czechoslovakia. The group was a small net exporter of softwood raw material in the mid-1970's, but by 2000 net trade should be negligible. Thus total supply of softwood industrial raw material should amount to about 53.2 million cbm, compared with 41.6 million cbm in the mid-1970's.

As noted above, this limited growth of softwood supplies could be rectified by a change in forest management policy. It is difficult to assess how significant an impact such a change would likely have. It is doubtful that the full 27 million cbm shortfall identified on Table 8.0.1 of Phase IV could be offset by a change in harvest policy, but some inroads into that deficit appear possible.

8.1.2 OUTLOOK FOR HARDWOODS

8.1.2.1 DEMAND OUTLOOK

Consumption of hardwood logs in Eastern Europe is expected to grow only marginally in the 1980-2000 period, rising from 23.6 to 31.5 million cbm. Compared with an estimated annual growth of 2.5% in the 1960-80 period, log consumption is projected to grow 1.5% annually during the following two decades. Sawlogs should roughly keep pace with fiber logs; their share is estimated at 54%, 51% and 50% in 1960, 1980 and 2000 respectively. Residuals are expected to represent 16%-19% of the region's hardwood pulpwood supply during the 1980-2000 period.

8.1.2.2 SUPPLY OUTLOOK

Hardwoods accounted for 42% of total fellings in Eastern Europe in the mid-1970's and their share is expected to decline to 39% by 2000, with a volume of 36.1 million cbm. This is 4 million cbm (12%) more than in the mid-1970's. Fuelwood made up 28% of the total in the mid-1970's, but this is expected to drop to about 20% by 2000, leaving industrial wood removals at 30.3 million cbm. This is also the forecast for total supply of hardwood industrial raw material, since net imports are expected to be negligible (there was a small net export in the mid-1970's). Total supply of hardwood industrial wood may thus increase by 7.4 million cbm or 2% compared with the mid-1970's. The reader is again reminded of the conservative nature of forest management policy in the countries involved, a change in which could expand the supply somewhat.

8.2 THE SOVIET UNION

The Soviet Union's forests are estimated to cover 785 million hectares or roughly 37% of its land area. Of that land area classified as forests, roughly 390 million hectares or half of the forest area are currently considered "exploitable", which basically means that they are now reasonably accessible for forest operations. As the Baikal-Amur-Magistral railway opens up new territory in Siberia, an additional 40 to 50 million hectares should eventually be added to this classification of exploitable forest area. About 82% of the forest area and growing stock is in the coniferous species, primarily larch, scots pine and spruce. The major hardwood is birch, which represents about two-thirds of the forest area and growing stock in broadleaved species.[1]

Removals in the Soviet Union have been growing constantly, rising from 277.2 million cbm in 1949-51 to 381.4 million cbm in 1969-71, an annualized rate of 1.6%. The bulk of these removals has been for industrial wood with fuelwood's share declining from 40.3% in 1949-51 to 29.8% in 1969-71. Coniferous species have accounted for most of the growth in removals with their share rising from 78% in 1949-51 to 83% in 1969-71. Sawlogs have accounted for the greatest volume increase, but pulpwood's share of industrial logs has gradually risen from 4% in 1949-51 to 11% in 1969-71.

The Soviet Union's forestry "center of gravity" has been gradually shifting east toward the hitherto unexploited regions of Siberia and the Far East. The speed with which these enormous reserves will be brought into production will fundamentally rest on national priorities. Because of the severe climate, low population and lack of infrastructure in those

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[1] Details in this section regarding the forest situation and outlook for the Soviet Union are derived from ETTS III, pp. 144-150.

regions, only a slow development of the resource base is foreseen. West of the Urals, removals already exceed the mean annual increment with over-cutting in some areas leaving little potential for an expanded harvest.

The Soviet Union's tenth 5-year Plan for 1976 to 1980 calls for an annual increase in removals of 2%. Should this be achieved, total removals would be about 650 million cbm of which industrial wood would probably represent 80% or 520 million cbm. The Working Party's forecast for supply projects that a somewhat slower rate of development will be achieved. Compared with the estimated 2.4% growth in supply of industrial roundwood between 1980 and 2000 which this would represent, the Working Party has assumed the more modest growth rate of 1.6%. This is barely lower than the 1.8% rate achieved in the 1960-70 period and could even overstate the speed with which the Soviet Union's virgin forests can offset the leveling off of supplies from Western Russia.

8.2.1 OUTLOOK FOR SOFTWOODS

8.2.1.1 DEMAND OUTLOOK

Consumption of softwood logs in the Soviet Union is expected to increase from 213.2 million cbm in 1960 to 272.3 and 362.4 million cbm in 1980 and 2000 respectively. The demand for logs to make solidwood products should continue growing slowly during the forecast period, rising 1.4% annually between 1980 and 2000 from 204.7 to 272.1 million cbm. This usual distinction between sawlogs and fiber logs, however, is less meaningful than for most other regions since the Soviet Union is believed to use extensive quantities of sawlog quality material for pulping. The percent of the domestic logs required for fabricated solidwood products has been declining from 81% in 1960 to an estimated 75% in 1980. The share of sawlogs is expected to level off at 75% through the year 2000.

Table 8.2.1.1 shows the Working Party's estimate for softwood residuals in 1980. These estimates are consonant with ECE/FAO's historical perspective, but the Working Party has increased the estimated future generation of residuals from 44% in 1980 to 50% in 2000 to reflect the expected impact of changing species, age class and geographic factors. Offsetting this expected change, however, is a marked shift in the Soviet Union's pattern of residuals reused for wood products. Without this expected change, the Soviet Union's estimated share of logs used for fabricated products would increase much more rapidly. Residuals are projected to comprise 92 out of the 205 million cbm of softwood logs consumed by domestic solid-wood products producers. Only 9.3 million cbm or 10% of these residuals, however, are estimated to reenter the product stream in 1980. Although this is up markedly from the 2% estimated for 1960, it lags significantly the developments of the wood rich market economies such as Canada and the United States. This consumption rate is expected to rise rapidly as residuals compete favorably with high cost Siberian sawlogs. A surge in residuals utilization, therefore, is projected in the next two decades with the level of reuse rising to 49 million cbm or 36% of residuals generated by 2000.

8.2.1.2 SUPPLY OUTLOOK

The outlook for softwood industrial roundwood supplies in the Soviet Union hinges on its priorities for national development rather than timber availability. The Soviet Union's closed forest land contains roughly 62 billion cbm of softwood growing stock. The projected 1980 softwood harvest level of 380 million cbm (including fuelwood) is thus a scant 0.6% of inventory. Despite this extremely low harvest level, however, ECE/FAO estimates that this level of removals exceeds by a wide margin the net annual increment on "exploitable" forests (325 million cbm over bark in 1973). The softwood increment on all "productive" forests, in fact, is only estimated at 555 million cbm over bark. Thus, the Soviet Union's long-term supply potential for softwoods, assuming full exploitation of its entire natural forests, is barely 500 million cbm (excluding bark, but including fuelwood).

Table 8.2.1.2 shows the U.S.S.R.'s estimated supply of industrial softwood logs. as noted above, a major assumption underlying this outlook is the shift toward residuals which should represent over 30% of the softwood pulpwood by year 2000. Without this shift, the projected share of pulpwood would clearly reach approximately 40% of the industrial roundwood harvest instead of the estimated 28% in 2000.

The Soviet Union's self-sufficiency in industrial roundwood is expected to increase markedly in the 1980-2000 period - but only because of the perceived fiber log trade from eastern forests to Japan. Table 8.2.1.2 shows that the Soviet Union has gradually increased its exports of industrial roundwood.

Softwood log exports have risen from the 1.7% level of 1960 to an estimated 4.1% in 1980. This is expected to reach 8.9% of industrial softwood removals by 2000. The reader is cautioned, however, to examine the assumptions under which the Japanese demand is created. Japan's supply shortfall could more readily be created in other regions were Japan to accept more imported pulp and paper products - or shift its technology even more toward hardwoods.

8.2.2 OUTLOOK FOR HARDWOODS

8.2.2.1 DEMAND OUTLOOK

Consumption of hardwood logs in the Soviet Union is substantially lower than that of softwoods. Table 8.2.2.1 shows that consumption for domestic use has stayed roughly static during the last two decades, rising only from 37.9 million cbm in 1960 to an estimated 42.1 million cbm in 1980. Consumption growth is expected to pick up marginally from 0.5% per year between 1960 and 1980 to 0.7% in the 1980-2000 period. Mill residuals should by that time represent as much as 23% of the hardwood pulpwood up from an estimated 8% in 1980.

8.2.2.2 SUPPLY OUTLOOK

Although only 17% of the U.S.S.R.'s growing stock is in hardwoods, it still contains an estimated inventory of 13 billion cbm. Thus, the U.S.S.R. has barely tapped its hardwood inventory. With 140 million hectares of exploitable forest and an estimated mean annual increment of 1.92 cbm/hectare (over bark) the annual hardwood increment from the Soviet Union's forests is in the range of 250 million cbm. By comparison the volume removed in recent years has been only 60-70 million cbm (including fuelwood) or roughly a quarter of the potential hardwood supply. Compared with ECE/FAO's estimate of a net annual increment on "exploitable" lands of 140 million cbm (over bark) the current consumption level of 38 million cbm (under bark) is but a fractional amount.

The Soviet Union has today developed only a token level of industrial hardwood net exports. A modest growth of supply is, however, projected to meet the perceived emerging shortages in a number of Western European countries.

8.3 CENTRALLY PLANNED ASIA

The forest outlook for Centrally Planned Asia is fundamentally the outlook for the People's Republic of China. The forest area has variously been estimated at 46 to 100 million hectares. Richardson's recent report estimates the natural forest at 80 million hectares with 60 million perceived potentially accessible. About 25 million hectares should be conifer stands. Growing stock has been variously estimated at 4.6 to 7.0 billion cbm.

Despite this extensive timber base, however, China is extremely short of timber when viewed on a per capita basis (annual consumption roughly 0.04 cbm per capita). China has in recent years mounted a huge afforestation program to begin offsetting the effects of years of over-cutting. According to one report, China afforested 27 million hectares in the decade following 1949. Even though very low survival rates seem probable, the impact of such a massive program should nevertheless be significant as the forests mature. The Working Party has attempted to account appropriately for this potential in preparing its supply outlook, but as noted in the footnote for section 8.0, its forecast of future timber supplies from this sub-region must be considered as highly speculative.

8.3.1 OUTLOOK FOR SOFTWOODS

8.3.1.1 DEMAND OUTLOOK

Consumption of softwood logs in Centrally Planned Asia is expected to grow from 41.3 million cbm in 1980 to 62.5 million cbm in 2000. This annualized increase of 2.1% is down somewhat from the 3.0% estimated for the 1960-80 period. Sawlogs are expected to continue representing over half of the softwood log consumption. Residuals are expected to represent an increasing part of this sub-region's fiber supply, accounting for perhaps 20% of softwood pulpwood by 2000.

8.3.1.2 SUPPLY OUTLOOK

It is expected that the softwood forests of Centrally Planned Asia will supply basically all of the demand which is projected. Occasional reports from China describing the building of new logging roads, the rich North-east forest and elsewhere, and the intensive planting effort undertaken since 1949 in China should enable sawlog and fiber log production to continue to grow at rates close to those of the 1960-80 period.

In the past China has imported relatively small volumes of softwood sawlogs on an erratic basis. China's policy, however, is basically to control its wood consumption to parallel the availability from its own forest. Accordingly, self-sufficiency in the 1980-2000 period has been estimated to remain at a level of 100%, but some periodic net imports of sawlogs might occur.

8.3.2 OUTLOOK FOR HARDWOODS

8.3.2.1 DEMAND OUTLOOK

Centrally Planned Asia's consumption of hardwood logs is estimated to grow from 25.8 million cbm in 1980 to 33.9 million cbm in 2000. This annualized growth rate of 1.4% is again projected to be down slightly from the 2.2% rate which is estimated for the 1960-80 period. Sawlogs are expected to gradually gain share from fiber logs, up to 67% of hardwood logs by 2000, compared with an estimated 60% in 1960. Residuals are expected to become a particularly important portion of the region's fiber log requirements, potentially equalling more than 20% of the material classified as fiber logs.

8.3.2.2 SUPPLY OUTLOOK

Supply of hardwood logs in Centrally Planned Asia is expected to match demand throughout the forecast period. Historically there has been a very limited trade of specialty logs between Far Eastern suppliers and the Chinese mainland which the Working Party expects to continue. The South Central and South Western regions of China as well as Indo-China, however, should provide enough supply to maintain self-sufficiency levels at 100% throughout the study period.

TABLE 8.0.1.1

CENTRALLY PLANNED ECONOMIES

ESTIMATED DEMAND ON THE FOREST FOR INDUSTRIAL SOFTWOOD

(Millions of Cubic Meters)

Sawlog Demand	1960	1970	1980	1990	2000
Sawnwood & Sleepers					
Product Volume	117.8	131.0	140.6	157.4	170.5
Residuals Created	90.1	100.9	107.3	132.6	156.6
Gross Wood-in-the-Rough	207.9	231.9	247.9	290.1	327.1
Solidwood Panels					
Product Volume	1.3	2.4	3.3	4.5	5.5
Residuals Created	1.6	2.7	4.2	5.6	7.0
Gross Wood-in-the-Rough	2.9	5.1	7.5	10.2	12.5
Dom. Sawlog Demand	210.8	237.0	255.4	300.3	339.6
Sawlog Trade-Exp(Imp)	1.7	6.7	7.1	10.1	12.2
Total Sawlog Demand	212.5	243.7	262.5	310.4	351.8
Fiberlog Demand					
Reconstituted Panels	1.3	7.4	14.7	19.7	23.9
Other Ind. Roundwood	45.0	46.3	48.4	48.2	48.1
Pulp	19.7	37.6	60.0	85.2	129.8
Subtotal Demand	66.0	91.3	123.1	153.1	201.8
Less: Residuals Reused Domestically	7.6	9.6	17.9	40.5	62.4
Net Dom. Fiberlog Demand	58.4	81.7	105.2	112.6	139.4
Fiberlog Trade-Exp(Imp)	1.8	6.7	4.8	6.8	22.3
Total Fiberlog Demand	60.2	88.4	110.0	119.4	161.7
TOTAL DEMAND FOR INDUSTRIAL SOFTWOODS	272.7	332.1	372.5	429.8	513.5

TABLE 8.0.2.1

CENTRALLY PLANNED ECONOMIES

ESTIMATED DEMAND ON THE FOREST FOR INDUSTRIAL HARDWOOD

(Millions of Cubic Meters)

Sawlog Demand	1960	1970	1980	1990	2000
Sawnwood & Sleepers					
Product Volume	26.0	27.7	29.2	31.9	35.3
Residuals Created	19.9	20.7	21.3	23.5	25.9
Gross Wood-in-the-Rough	45.9	48.4	50.5	55.4	61.3
Solidwood Panels					
Product Volume	0.9	1.7	2.3	3.2	3.8
Residuals Created	0.9	2.0	3.1	3.9	4.7
Gross Wood-in-the-Rough	1.8	3.7	5.4	6.9	8.5
Dom. Sawlog	47.7	52.1	55.9	62.3	69.8
Sawlog Trade-Exp(Imp)	-	(0.1)	-	(0.8)	(1.5)
Total Sawlog Demand	47.7	52.0	55.9	61.5	68.3
Fiberlog Demand					
Reconstituted Panels	0.6	2.4	4.5	6.4	8.8
Other Ind. Roundwood	18.9	24.3	26.3	26.0	26.6
Pulp	3.5	6.0	9.6	16.0	20.5
Subtotal Demand	23.0	32.7	40.4	48.4	55.9
Less: Residuals Reused Domestically	1.7	3.2	4.8	8.7	12.0
Net Dom. Fiberlog Demand	21.3	29.5	35.6	39.7	43.9
Fiberlog Trade-Exp(Imp)	-	-	0.9	1.4	1.8
Total Fiberlog Demand	21.3	29.5	36.5	41.1	45.7
TOTAL DEMAND FOR INDUSTRIAL HARDWOODS	69.0	81.5	92.4	102.6	114.0

TABLE 8.0.1.2

CENTRALLY PLANNED ECONOMIES
ESTIMATED SUPPLY AND SELF-SUFFICIENCY TRENDS
FOR INDUSTRIAL ROUNDWOOD

(Millions of Cubic Meters)

Softwoods	1960	1970	1980	1990	2000
Sawlogs					
Domestic Supply	212.5	243.7	262.5	310.4	351.8
Net Imports (Exports)	(1.7)	(6.7)	(7.1)	(10.1)*	(12.2)*
Sawlogs Consumed	210.8	237.0	255.4	300.3	339.6
Residuals Reused					
Domestic Supply	7.6	9.6	17.9	40.5	62.4
Net Imports (Exports)	-	-	-	-	-
Residuals Supplied	7.6	9.6	17.9	40.5	62.4
Fiber Logs					
Domestic Supply	60.2	88.4	110.0	119.4	161.7
Net Imports (Exports)	(1.8)	(6.7)	(4.8)	(6.8)	(22.3)*
Fiber Logs Consumed	58.4	81.7	105.2	112.6	139.4
Softwood Logs Supplied	272.7	332.1	372.5	429.8	513.5
FAO Report Basis		326.3			
Hardwoods					
Sawlogs					
Domestic Supply	47.7	52.0	55.9	61.5	68.3
Net Imports (Exports)	-	0.1	-	0.8*	1.5*
Sawlogs Consumed	47.7	52.1	55.9	62.3	69.8
Residuals Reused					
Domestic Supply	1.8	3.2	4.8	8.7	12.0
Net Imports (Exports)	-	-	-	-	-
Residuals Supplied	1.8	3.2	4.8	8.7	12.0
Fiber Logs					
Domestic Supply	21.3	29.5	36.5	41.1	45.7
Net Imports (Exports)	-	-	(0.9)*	(1.4)*	(1.8)*
Fiber Logs Consumed	21.3	29.5	35.6	39.7	43.9
Hardwood Logs Supplied	69.0	81.5	92.4	102.6	114.0
FAO Report Basis		73.5			
TOTAL LOGS SUPPLIED	341.7	413.6	464.9	532.4	627.5

TABLE 8.1.1.1

EASTERN EUROPE

ESTIMATED DEMAND ON THE FOREST FOR INDUSTRIAL SOFTWOOD

(Millions of Cubic Meters)

Sawlog Demand	1960	1970	1980	1990	2000
Sawnwood & Sleepers					
Product Volume	15.6	15.0	17.0	18.5	19.7
Residuals Created	8.3	8.0	8.5	9.3	9.9
Gross Wood-in-the-Rough	23.9	23.0	25.5	27.8	29.6
Solidwood Panels					
Product Volume	0.2	0.3	0.3	0.4	0.5
Residuals Created	0.2	0.3	0.4	0.5	0.6
Gross Wood-in-the-Rough	0.4	0.6	0.8	0.9	1.1
Dom. Sawlog Demand	24.3	23.6	26.3	28.7	30.7
Sawlog Trade-Exp(Imp)	(0.1)	(0.9)	-	(0.5)	(0.9)
Total Sawlog Demand	24.2	22.7	26.3	28.2	29.8
Fiberlog Demand					
Reconstituted Panels	0.5	2.4	4.6	6.1	7.3
Other Ind. Roundwood	6.1	7.7	7.5	7.3	7.1
Pulp	5.9	8.3	12.9	14.5	15.6
Subtotal Demand	12.5	18.4	25.0	27.9	30.0
Less: Residuals Reused Domestically	3.8	3.7	4.3	5.4	6.6
Net Dom. Fiberlog Demand	8.7	14.7	20.7	22.5	23.4
Fiberlog Trade-Exp(Imp)	-	0.3	0.3	-	-
Total Fiberlog Demand	8.7	15.0	21.0	22.5	23.4
TOTAL DEMAND FOR INDUSTRIAL SOFTWOODS	32.9	37.7	47.3	50.7	53.2

TABLE 8.1.2.1

EASTERN EUROPE

ESTIMATED DEMAND ON THE FOREST FOR INDUSTRIAL HARDWC

(Millions of Cubic Meters)

Sawlog Demand	1960	1970	1980	1990	2000
Sawnwood & Sleepers					
Product Volume	4.2	5.8	6.5	7.1	8.1
Residuals Created	2.2	3.1	3.2	3.6	4.1
Gross Wood-in-the-Rough	6.5	8.9	9.7	10.7	12.2
Solidwood Panels					
Product Volume	0.6	0.8	1.0	1.3	1.5
Residuals Created	0.7	1.0	1.3	1.6	1.9
Gross Wood-in-the-Rough	1.3	1.8	2.3	2.8	3.4
Dom. Sawlog	7.8	10.7	12.0	13.5	15.6
Sawlog Trade-Exp(Imp)	(0.2)	(0.1)	-	(0.8)	(1.5)
Total Sawlog Demand	7.6	10.6	12.0	12.7	14.1
Fiberlog Demand					
Reconstituted Panels	0.3	1.3	2.6	3.4	5.1
Other Ind. Roundwood	5.1	5.8	5.7	6.2	6.8
Pulp	2.6	3.8	5.5	7.1	7.7
Subtotal Demand	8.0	10.9	13.8	16.7	19.6
Less: Residuals Reused Domestically	1.3	1.8	2.2	2.8	3.7
Net Dom. Fiberlog Demand	6.7	9.1	11.6	13.9	15.9
Fiberlog Trade-Exp(Imp)	-	-	0.3	0.3	0.3
Total Fiberlog Demand	6.7	9.1	11.9	14.2	16.2
TOTAL DEMAND FOR INDUSTRIAL HARDWOODS	14.3	19.7	23.9	26.9	30.3

TABLE 8.1.1.2

EASTERN EUROPE

ESTIMATED SUPPLY AND SELF-SUFFICIENCY TRENDS FOR INDUSTRIAL ROUNDWOOD

(Millions of Cubic Meters)

Softwoods	1960	1970	1980	1990	2000
Sawlogs					
Domestic Supply	24.2	22.7	26.3	28.2	29.8
Net Imports (Exports)	0.1	0.9	-	0.5	0.9
Sawlogs Consumed	24.3	23.6	26.3	28.7	30.7
Residuals Reused					
Domestic Supply	3.8	3.7	4.3	5.4	6.6
Net Imports (Exports)	-	-	-	-	-
Residuals Supplied	3.8	3.7	4.3	5.4	6.6
Fiber Logs					
Domestic Supply	8.7	15.0	21.0	22.5	23.4
Net Imports (Exports)	-	(0.3)	(0.3)	-	-
Fiber Logs Consumed	8.7	14.7	20.7	22.5	23.4
Softwood Logs Supplied	32.9	37.7	47.3	50.7	53.2
FAO Report Basis		38.2			
Hardwoods					
Sawlogs					
Domestic Supply	7.6	10.6	12.0	12.7	14.1
Net Imports (Exports)	0.2	0.1	-	0.8*	1.5*
Sawlogs Consumed	7.8	10.7	12.0	13.5	15.6
Residuals Reused					
Domestic Supply	1.3	1.8	2.2	2.8	3.7
Net Imports (Exports)	-	-	-	-	-
Residuals Supplied	1.3	1.8	2.2	2.8	3.7
Fiber Logs					
Domestic Supply	6.7	9.1	11.9	14.2	16.2
Net Imports (Exports)	-	-	(0.3)*	(0.3)*	(0.3)*
Fiber Logs Consumed	6.7	9.1	11.6	13.9	15.9
Hardwood Logs Supplied	14.3	19.7	23.9	26.9	30.3
FAO Report Basis		21.2			
TOTAL LOGS SUPPLIED	47.2	57.4	71.2	77.6	83.5

TABLE 8.2.1.1

U.S.S.R.

ESTIMATED DEMAND ON THE FOREST FOR INDUSTRIAL SOFTWOOD

(Millions of Cubic Meters)

Sawlog Demand	1960	1970	1980	1990	2000
Sawnwood & Sleepers					
Product Volume	94.1	105.5	110.2	122.2	130.7
Residuals Created	75.2	84.4	88.1	109.9	130.6
Gross Wood-in-the-Rough	169.3	189.9	198.3	232.1	261.3
Solidwood Panels					
Product Volume	1.1	2.0	2.8	3.8	4.7
Residuals Created	1.4	2.4	3.7	4.9	6.1
Gross Wood-in-the-Rough	2.5	4.4	6.4	8.8	10.8
Dom. Sawlog Demand	171.8	194.3	204.7	240.9	272.1
Sawlog Trade-Exp(Imp)	1.8	7.5	7.1	10.6	13.1
Total Sawlog Demand	173.6	201.9	211.8	251.5	285.2
Fiberlog Demand					
Reconstituted Panels	0.4	4.3	9.1	11.9	14.1
Other Ind. Roundwood	30.5	28.3	27.6	27.4	27.2
Pulp	11.6	25.6	40.2	60.6	98.2
Subtotal Demand	42.5	58.2	76.9	99.9	139.5
Less: Residuals Reused Domestically	1.1	2.5	9.3	29.7	49.2
Net Dom. Fiberlog Demand	41.4	55.7	67.6	70.2	90.3
Fiberlog Trade-Exp(Imp)	1.8	6.4	4.5	6.8	22.3
Total Fiberlog Demand	43.2	62.1	72.1	77.0	112.6
TOTAL DEMAND FOR INDUSTRIAL SOFTWOODS	216.8	263.9	283.9	328.5	397.8

TABLE 8.2.2.1

U.S.S.R.

ESTIMATED DEMAND ON THE FOREST FOR INDUSTRIAL HARDWOOD

(Millions of Cubic Meters)

Sawlog Demand	1960	1970	1980	1990	2000
Sawnwood & Sleepers					
Product Volume	16.6	15.3	14.5	14.9	15.5
Residuals Created	13.3	12.2	11.6	11.9	12.4
Gross Wood-in-the-Rough	29.9	27.5	26.1	26.8	27.9
Solidwood Panels					
Product Volume	0.1	0.6	0.9	1.3	1.5
Residuals Created	0.1	0.8	1.4	1.7	2.0
Gross Wood-in-the-Rough	0.2	1.4	2.3	2.9	3.5
Dom. Sawlog	30.1	28.9	28.4	29.7	31.4
Sawlog Trade-Exp(Imp)	0.1	-	-	-	-
Total Sawlog Demand	30.2	28.9	28.4	29.7	31.4
Fiberlog Demand					
Reconstituted Panels	0.2	0.5	1.1	1.6	1.9
Other Ind. Roundwood	7.7	10.6	11.3	11.4	11.5
Pulp	-	0.9	2.5	5.9	8.5
Subtotal Demand	7.9	12.0	14.9	18.9	21.9
Less: Residuals Reused Domestically	0.1	0.5	1.2	3.6	5.0
Net Dom. Fiberlog Demand	7.8	11.5	13.7	15.3	16.9
Fiberlog Trade-Exp(Imp)	-	-	0.6	1.1	1.5
Total Fiberlog Demand	7.8	11.5	14.3	16.4	18.4
TOTAL DEMAND FOR INDUSTRIAL HARDWOODS	38.0	40.4	42.7	46.1	49.8

TABLE 8.2.1.2

USSR

ESTIMATED SUPPLY AND SELF-SUFFICIENCY TRENDS

FOR INDUSTRIAL ROUNDWOOD

(Millions of Cubic Meters)

Softwoods	1960	1970	1980	1990	2000
Sawlogs					
Domestic Supply	173.6	201.9	211.8	251.5	285.2
Net Imports (Exports)	(1.8)	(7.5)	(7.1)	(10.6)*	(13.1)*
Sawlogs Consumed	171.8	194.3	204.7	240.9	272.1
Residuals Reused					
Domestic Supply	1.1	2.5	9.3	29.7	49.2
Net Imports (Exports)	-	-	-	-	-
Residuals Supplied	1.1	2.5	9.3	29.7	49.2
Fiber Logs					
Domestic Supply	43.2	62.1	72.1	77.0	112.6
Net Imports (Exports)	(1.8)	(6.4)	(4.5)	(6.8)	(22.3)
Fiber Logs Consumed	41.4	55.7	67.6	70.2	90.3
Softwood Logs Supplied	216.8	264.0	283.9	328.5	397.8
FAO Report Basis		260.7			
Hardwoods					
Sawlogs					
Domestic Supply	30.2	28.9	28.4	29.7	31.4
Net Imports (Exports)	(0.1)	-	-	-	-
Sawlogs Consumed	30.1	28.9	28.4	29.7	31.4
Residuals Reused					
Domestic Supply	0.1	0.5	1.2	3.6	5.0
Net Imports (Exports)	-	-	-	-	-
Residuals Supplied	0.1	0.5	1.2	3.6	5.0
Fiber Logs					
Domestic Supply	7.8	11.5	14.3	16.4	18.4
Net Imports (Exports)	-	-	(0.6)*	(1.1)*	(1.5)*
Fiber Logs Consumed	7.8	11.5	13.7	15.3	16.9
Hardwood Logs Supplied	38.0	40.4	42.7	46.1	49.8
FAO Report Basis		33.7			
TOTAL LOGS SUPPLIED	254.8	304.4	326.6	374.6	447.6

TABLE 8.3.1.1

CENTRALLY PLANNED ASIA

ESTIMATED DEMAND ON THE FOREST FOR INDUSTRIAL SOFTWOOD

(Millions of Cubic Meters)

Sawlog Demand	1960	1970	1980	1990	2000
Sawnwood & Sleepers					
Product Volume	8.1	10.5	13.4	16.7	20.1
Residuals Created	6.6	8.5	10.7	13.4	16.1
Gross Wood-in-the-Rough	14.7	19.0	24.1	30.2	36.2
Solidwood Panels					
Product Volume	-	0.1	0.2	0.3	0.3
Residuals Created	-	-	0.1	0.2	0.3
Gross Wood-in-the-Rough	-	0.1	0.3	0.5	0.6
Dom. Sawlog Demand	14.7	19.1	24.4	30.7	36.8
Sawlog Trade-Exp(Imp)	-	0.1	-	-	-
Total Sawlog Demand	14.7	19.2	24.4	30.7	36.8
Fiberlog Demand					
Reconstituted Panels	0.4	0.7	1.0	1.7	2.5
Other Ind. Roundwood	8.4	10.3	13.3	13.5	13.8
Pulp	2.2	3.7	6.9	10.1	16.0
Subtotal Demand	11.0	14.7	21.2	25.3	32.3
Less: Residuals Reused Domestically	2.7	3.4	4.3	5.4	6.6
Net Dom. Fiberlog Demand	8.3	11.3	16.9	19.9	25.7
Fiberlog Trade-Exp(Imp)	-	-	-	-	-
Total Fiberlog Demand	8.3	11.3	16.9	19.9	25.7
TOTAL DEMAND FOR INDUSTRIAL SOFTWOODS	23.0	30.5	41.3	50.6	62.5

TABLE 8.3.2.1

CENTRALLY PLANNED ASIA

ESTIMATED DEMAND ON THE FOREST FOR INDUSTRIAL HARDWOOD

(Millions of Cubic Meters)

Sawlog Demand	1960	1970	1980	1990	2000
Sawnwood & Sleepers					
Product Volume	5.2	6.6	8.2	9.9	11.7
Residuals Created	4.3	5.4	6.5	8.0	9.4
Gross Wood-in-the-Rough	9.4	12.0	14.7	17.9	21.2
Solidwood Panels					
Product Volume	0.2	0.3	0.4	0.6	0.8
Residuals Created	0.1	0.2	0.4	0.6	0.8
Gross Wood-in-the-Rough	0.3	0.5	0.8	1.2	1.6
Dom. Sawlog	9.9	12.5	15.5	19.1	22.8
Sawlog Trade-Exp(Imp)	0.1	-	-	-	-
Total Sawlog Demand	10.0	12.5	15.5	19.1	22.8
Fiberlog Demand					
Reconstituted Panels	0.1	0.6	0.8	1.4	1.8
Other Ind. Roundwood	6.1	7.9	9.3	8.4	8.3
Pulp	0.9	1.3	1.6	3.0	4.3
Subtotal Demand	7.1	9.8	11.7	12.8	14.4
Less: Residuals Reused Domestically	0.3	0.9	1.4	2.3	3.3
Net Dom. Fiberlog Demand	6.8	8.9	10.3	10.5	11.1
Fiberlog Trade-Exp(Imp)	-	-	-	-	-
Total Fiberlog Demand	6.8	8.9	10.3	10.5	11.1
TOTAL DEMAND FOR INDUSTRIAL HARDWOODS	16.8	21.4	25.8	29.6	33.9

TABLE 8.3.1.2
CENTRALLY PLANNED ASIA
ESTIMATED SUPPLY AND SELF-SUFFICIENCY TRENDS FOR INDUSTRIAL ROUNDWOOD

(Millions of Cubic Meters)

Softwoods	1960	1970	1980	1990	2000
Sawlogs					
Domestic Supply	14.7	19.2	24.4	30.7	36.8
Net Imports (Exports)	-	(0.1)	-	-	-
Sawlogs Consumed	14.7	19.1	24.4	30.7	36.8
Residuals Reused					
Domestic Supply	2.7	3.4	4.3	5.4	6.6
Net Imports (Exports)	-	-	-	-	-
Residuals Supplied	2.7	3.4	4.3	5.4	6.6
Fiber Logs					
Domestic Supply	8.3	11.3	16.9	19.9	25.7
Net Imports (Exports)	-	-	-	-	-
Fiber Logs Consumed	8.3	11.3	16.9	19.9	25.7
Softwood Logs Supplied	23.0	30.5	41.3	50.6	62.5
FAO Report Basis		27.4			
Hardwoods					
Sawlogs					
Domestic Supply	10.0	12.5	15.5	19.1	22.8
Net Imports (Exports)	(0.1)	-	-	-	-
Sawlogs Consumed	9.9	12.5	15.5	19.1	22.8
Residuals Reused					
Domestic Supply	0.3	0.9	1.4	2.3	3.3
Net Imports (Exports)	-	-	-	-	-
Residuals Supplied	0.3	0.9	1.4	2.3	3.3
Fiber Logs					
Domestic Supply	6.8	8.9	10.3	10.5	11.1
Net Imports (Exports)	-	-	-	-	-
Fiber Logs Consumed	6.8	8.9	10.3	10.5	11.1
Hardwood Logs Supplied	16.8	21.4	25.8	29.6	33.9
FAO Report Basis		18.6			
TOTAL LOGS SUPPLIED	39.8	51.9	67.1	80.2	96.4

APPENDIX

Working Party Composition and Assignments

Western Hemisphere Team		
Member and Affiliation	Geographic Area	Major Responsibilities
Bruce J. McGroarty Duncan Naysmith ABITIBI PAPER CO., LTD.	Eastern Canada	Wood Products Demand Conversion Factors Residual Usage Fiber Supply
Arvid Thorstensen M. F. Painter COUNCIL OF FOREST INDUSTRIES	Western Canada	Wood Products Demand Conversion Factors Residual Usage Fiber Supply
Gordon A. Venne OWENS-ILLINOIS Charles Shih ST. REGIS PAPER CO.	Northern United States	Wood Products Demand Conversion Factors Residual Usage Fiber Supply
James E. Allen ST. REGIS PAPER CO. W. N. Haynes UNION CAMP CORP.	Southern United States	Wood Products Demand Conversion Factors Residual Usage Fiber Supply
Thomas R. Terfehr CHAMPION INTERNATIONAL John E. Wishart GEORGIA PACIFIC	Western United States	Wood Products Demand Conversion Factors Residual Usage Fiber Supply
Paul Areson UNION CAMP CORP.	United States	Wood Products Demand
Dr. James Yoho INTERNATIONAL PAPER CO. Emil Jones FOOD AND AGRICULTURE ORGANIZATION	Latin America	Wood Products Demand Conversion Factors Residual Usage Fiber Supply
Antoinette S. Gabriel CROWN ZELLERBACH CORP.	Western Hemisphere	Regional Working Party Coordinator

Africa, Europe, U.S.S.R.

Member and Affiliation	Geographic Area	Major Responsibilities
Jean P. Lanly FAO, Rome	Africa South of the Sahara	Fiber Supply Coordinator
Felix Palmer NORTH AMERICAN LUMBER SALES LIMITED	Africa, Mid-East, United Kingdom	Wood Products Demand
E. Clicheroux MINISTRY OF AGRICULTURE	Belgium	Wood Supply
V. Grenaa Kristensen ROYAL VETERINARY AND AGRICULTURAL UNIVERSITY	Denmark	Wood Supply
Heinrich Ollmann FEDERAL RESEARCH CENTRE OF FORESTRY AND FOREST PRODUCTS	Federal Republic of Germany	Sawnwood
Karl Oedekoven MINISTRY OF FOOD, AGRICULTURE AND FORESTRY	Federal Republic of Germany	Wood Supply
Hannu Valtanen CENTRAL ASSOCIATION OF FINNISH FOREST INDUSTRIES	Finland	Wood Supply
Paavo Miettinen FINNISH SAWMILL OWNERS' ASSOCIATION	Finland	Sawnwood
Seppo Vainio FINNISH SAWMILL OWNERS' ASSOCIATION	Finland	Sawnwood
K. Kuusela FOREST RESEARCH INSTITUTE	Finland	Wood Supply
Gerard Lemaignen FEDERATION FRANCAISE DES BOIS TROPICAUX	France	Sawnwood

Africa, Europe, U.S.S.R. (cont'd.)		
Member and Affiliation	Geographic Area	Major Responsibilities
Guy Degos MINISTRY OF AGRICULTURE	France	Wood Supply
O. Katsanos GENERAL DIRECTORATE OF FORESTS	Greece	Wood Supply
Aladar Halasz MINISTRY OF FOOD AND AGRICULTURE	Hungary	Wood Supply
Guglielmo Giordano GENERAL ITALIAN TIMBER INDUSTRY FEDERATION	Italy	Sawnwood Wood Supply
E. Lammerts van Bueren STATE FOREST SERVICE	Netherlands	Wood Supply
Arne Scheistroen MINISTRY OF AGRICULTURE	Norway	Wood Supply
Halvor Skjelmerud NORWEGIAN INSTITUTE OF WOOD-WORKING TECHNIQUES AND WOOD TECHNOLOGY	Norway	Sawnwood
Tadeusz Trampler FOREST RESEARCH INSTITUTE	Poland	Wood Supply
Jose Caetano Velez MINISTRY OF AGRICULTURE AND FISHERIES	Portugal	Wood Supply
Ruis Teixeira Lopo PORTUCEL	Portugal	Sawnwood
Javier Martinez Millan ICONA	Spain	Wood Supply
Nils-Erik Nilsson NATIONAL BOARD OF FORESTRY	Sweden	Wood Supply

Africa, Europe, U.S.S.R. (cont'd.)

Member and Affiliation	Geographic Area	Major Responsibilities
Lars Strangh SWEDISH WOOD EXPORTERS' ASSOCIATION	Sweden	Sawnwood
S. Uhlin SWEDISH WOOD EXPORTERS' ASSOCIATION	Sweden	Sawnwood
Andrea Semadeni FEDERAL INSPECTORATE OF FORESTRY	Switzerland	Wood Supply
R. D. S. Church ALBERNICONSULT	Turkey	Wood Supply
Gwyn Frances FORESTRY COMMISSION	United Kingdom	Wood Supply
D. Orescanin	Yugoslavia	Wood Supply
W. E. Townsley COUNCIL OF FOREST INDUSTRIES OF BRITISH COLUMBIA	Europe	Plywood & Veneer
A. W. Barghoorn GERMAN WOOD-BASED BOARD ASSOCIATION	Europe	Particleboard
K. Bengtson SWEDISH FIBREBOARD ASSOCIATION AND FEDERATION OF NORDIC FIBREBOARD INDUSTRIES	Europe	Fiberboard
Otto Eckmullner HOCHSCHULE FUR BODENKULTUR	Europe	Regional Working Party Coordinator
T. J. Peck ECE, Geneva	Europe	Fiber Supply Coordinator

Eastern Hemisphere Team		
Member and Affiliation	Geographic Area	Major Responsibilities
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Simeon A. de Jesus PAPER INDUSTRY CORP. OF THE PHILIPPINES	Philippines	Wood Products Demand & Supply
Narong Pengprecha ROYAL FOREST DEPT. Thailand	Thailand	Wood Products Demand & Supply
Lee Let MALAYSIAN TIMBER INDUSTRY BOARD, Malaysia	Malaysia	Wood Products Demand & Supply
Katsuhiro Kotari JAPAN INTERNATIONAL COOPERATION AGENCY, Japan	Japan	Wood Products Demand & Supply
T. R. Brabin VICTORIA SAWMILLERS ASSOC. Australia	Australia Fiji	Wood Products Demand & Supply
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Jean P. Lanly FAO Rome, Italy	Far East	Fibre Supply Coordinator

Member and Affiliation	
Stanley L. Pringle FAO Rome, Italy	Coordinator for FAO Cooperation
Theodore D. Frey CROWN ZELLERBACH CORP.	PROJECT LEADER