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and Competition between Natural and Synthetic
Rubber

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FAO PROJECTIONS OF THE WORLD RUBBER

MARKET TO 1980

presented by

FAO, Rome
Commodities and Trade Division

We regret that some of the pages in the microfiche copy of this report may not be up to the proper legibility standards, even though the best possible copy was used for preparing the master fiche.

The following reproduces the chapter on rubber from "Agricultural Commodity Projections, 1970-1980", a document recently published by the Commodities and Trade Division of the Food and Agriculture Organization of the United Nations.

RUBBER

Introduction

755. Natural rubber and the seven major synthetic rubbers are used in some 9 000 separate end-products. Of these, the most important are in the tire sector, which accounts for some 60 percent of total elastomer consumption, while nontire end-uses such as hoses, belting, footwear, surgical goods, wires and cables, rubberized cloth, etc., absorb the remainder. About two thirds of natural rubber consumption occurs in the tire sector.

756. Total elastomer usage increased by about 73 percent between 1961-63 and 1970⁺, but while consumption of synthetic rubbers rose by some 107 percent, that of natural rubber increased by only about 32 percent. Consequently, the share of natural rubber in total elastomer consumption declined from about 45 percent in 1961-63 to about one third toward the end of the sixties.

757. However, all natural rubber produced during the past decade has been sold and these supplies have even been supplemented, particularly in the United States, by considerable government stockpile releases, which fluctuated between 1 and 8 percent of annual world production. Without the synthetic elastomer industry, rubber would clearly have been an extremely scarce and high-priced product, and the availability of ample supplies of cheaper synthetic material has undoubtedly been the major factor in the downward trend of natural rubber prices since the early sixties. Natural rubber has benefited from intense efforts to improve processing, presentation and marketing and, most recently, the commercial introduction of yield stimulants is based on ethylene as against the traditional stimulants injecting a positive new element into the world natural rubber supply situation.

Demand projections

758. Projections of industrial demand for all elastomers were made for each country or group of countries based on the general income and population growth assumptions applied throughout this study, and on demand elasticity coefficients derived from time series covering the years 1955 to 1970⁺. The rates of growth derived from these projections (Table 1) were then adjusted by such factors as the anticipated growth in the production of automobiles in major consuming countries and their known patterns of requirements for passenger car, truck and bus tires. A generally lower rate of replacement was assumed for the future, with the achievement of higher mileages per tire. In addition, it was assumed that the U.S.S.R. and eastern European countries would adopt wider motorization programmes, and that the transportation needs of developing countries would grow rapidly and be increasingly met by domestic production. It was not, however, possible to take any account of the potential penetration of the markets for established elastomers by new elastomeric materials which are now in various stages of research and development.

759. World elastomer demand in 1980 is projected at 15.8 to 16.4 million tons, the difference reflecting the two GDP assumptions (trend and high alternatives respectively) for developing countries (Table 2). In absolute terms, increases in elastomer consumption between 1970⁺ and 1980 are projected to be largest in developed countries and lowest in developing countries even under the high GDP assumption for the latter countries. In percentage terms, on the other hand, demand in developing countries is projected to grow most rapidly even under the trend GDP assumption and to grow most slowly in developed countries, i.e. by 123-191 percent in developing countries, by 107 percent in centrally planned countries and by 71 percent in developed countries.

760. With the exception of speciality rubbers which do not compete with natural rubber, the elastomer market can be considered - as a simplification - to fall into two sectors, the first dominated by synthetic rubbers of the styrene-butadiene-rubber (SBR) type (also including stereo rubbers such as polybutadiene (BR) and ethylene-propylene-diene-monomer (EPDM), and the second shared between natural rubber and synthetic rubber of the

Table 1 - Elastomers: Annual growth rates in total consumption

	1955-57	1961-63	1970 ⁺	
	to 1961-63	to 1970 ⁺	Trend	High
	(. Percent)			
<u>WORLD</u>	6.9	7.1	6.2	6.6
<u>ECONOMIC CLASS I</u>	4.6	7.1		5.5
<u>North America</u>	2.2	5.5		4.8
United States	2.1	5.5		4.8
Canada	3.3	6.5		5.5
<u>Western Europe</u>	6.9	7.8		5.7
Germany, Fed. Rep. of	7.8	9.4		5.5
France	5.7	6.6		4.6
Italy	14.4	8.3		7.9
United Kingdom	2.9	5.3		4.5
<u>Other developed market economies</u>	11.4	11.2		7.0
Japan	16.2	12.7		7.4
<u>ECONOMIC CLASS II</u>	9.4	10.2	8.4	11.3
Brazil	9.2	6.6	7.2	8.9
Mexico	8.2	8.9	7.8	8.8
India	12.4	8.4	8.8	15.1
<u>ECONOMIC CLASS III</u>	15.5	5.9		7.4

polyisoprene type. The relative size of the two sectors is determined largely on technical grounds, and it is believed that the current area of competition between them on price alone is relatively small ^{1/}.

761. In the second sector, synthetic polyisoprene almost duplicates the properties of natural rubber, and the remaining differences may be overcome in time. Since these two rubbers are very similar technically, their usage will be determined largely by the price and availability of each type. So far, synthetic polyisoprene has only been available in limited quantities, but with declining costs of production its price has fallen significantly since it was introduced in the early sixties.

762. In order to determine the shares accruing to natural and synthetic rubbers within the total elastomer demand projections, two alternative projections were made, based on past trends and recent developments in technology, marketing and prices. For the basic projections, which reflect a constant trend in relative prices as between natural and synthetic rubber, i.e. a continuing downward trend in the absolute level of prices of both natural and all the non-speciality synthetic rubbers, it was assumed that the newly developed yield stimulation techniques using ethylene gas ("Ethrel") will lower costs of natural rubber production significantly although the long-term effects of these chemicals on output are not yet precisely known. On this projection, most producing countries are assumed able to sell their natural rubber at a c.i.f. price for RSS 1 of between 12 and 14 cents per lb in 1980, and very efficient single producers even lower,

^{1/} According to a survey carried out by the International Rubber Study Group, the potential substitution area is of the order of 5 percent of the total elastomer market, less the small part taken by speciality rubbers where demand is determined solely on technological grounds.

Table 2 - Elastomers: Total demand, 1961-63 and 1964-66 averages, 1970⁺ and projections for 1980

	1961-63 average	1964-66 average	1970 ⁺	1980	
				Trend	High
(. Thousand tons)					
<u>WORLD</u>	4 977	6 245	8 631	15 815	16 381
WORLD, excl. China (Mainland)	4 856	6 052	8 311	15 215	15 781
<u>ECONOMIC CLASS I</u>	3 460	4 350	5 999	10 279	
<u>North America</u>	1 807	2 243	2 778	4 451	
United States	1 698	2 100	2 598	4 143	
Canada	109	144	180	308	
<u>Western Europe</u>	1 243	1 565	2 265	3 946	
<u>EEC</u>	744	927	1 399	2 435	
Belgium-Luxembourg	33	43	74	112	
France	239	284	400	626	
Germany, Fed. Rep. of	279	356	570	970	
Italy	159	201	302	647	
Netherlands	34	43	53	80	
United Kingdom	304	368	460	712	
Spain	47	74	113	298	
Sweden	42	55	83	138	
Yugoslavia	21	33	53	98	
Other western Europe	86	108	157	265	
<u>Other developed market economies</u>	410	542	956	1 882	
Oceania	70	84	105	171	
South Africa	36	51	62	118	
Japan	295	394	770	1 569	
<u>ECONOMIC CLASS II</u>	364	522	837	1 868	2 434
Brazil	67	74	112	224	262
Argentina	42	57	65	114	156
Mexico	37	51	73	155	169
India	64	83	122	283	496
Turkey	7	19	33	163	209
Others	167	240	432	929	1 142
<u>ECONOMIC CLASS III</u>	1 134	1 373	1 795	3 668	
<u>U.S.S.R. and eastern Europe</u>	1 013	1 180	1 475	3 068	
U.S.S.R.	731	798	963	2 154	
Eastern Europe	282	381	512	914	
Bulgaria	19	31	70	104	
Czechoslovakia	68	97	110	153	
German Democratic Rep.	70	85	85	114	
Hungary	21	27	35	50	
Poland	75	94	134	215	
Romania	30	46	77	278	
China (Mainland)	121	193	320	600	

Note: Totals are computed from unrounded data.

compared to an average price of around 20 U.S. cents per pound in 1970. Considerably lower costs of natural rubber production combined with no technical breakthrough in polyisoprene production could imply that polyisoprene sales prices equivalent to the c.i.f. natural rubber price might only fall to between 15 to 17 cents per pound in 1980 from about 18 to 19 cents per pound in 1970 ^{1/}. This could greatly discourage further investment in polyisoprene capacities. Moreover, lower natural rubber prices over a prolonged period, resulting from the widespread application of the newly introduced stimulant "Ethrel", is assumed on this projection to regain for natural rubber part of the small market lost to those synthetic general-purpose rubbers which compete partly on price grounds, and prices of which are not assumed to fall to the same extent.

763. In addition, a set of relatively favourable assumptions were made in the basic projection for the share of the market going to natural rubber. This was based on the possibility that an increasing proportion of speciality, heavy truck, aircraft, racing and winter tires, and a growing proportion of radial tires compared to conventional cross-ply tires in passenger cars, will all lead to higher natural rubber requirements. Further improvements in natural rubber marketing and processing methods, and more rapid progress in tailoring natural rubber to certain end-uses, could also further improve the competitive position of natural versus synthetic rubbers. In these favourable circumstances for natural rubber, it was also assumed that the centrally planned countries will not fully implement their production plans for new synthetic rubber capacity (particularly polyisoprene), so that, as in the recent past, they will remain more dependent on natural rubber imports than indicated by their plans. It was further assumed that developing countries will predominantly require truck tires for their industrialization, so that they will need much more natural rubber than if they required chiefly passenger car tires.

764. The supplementary projections, on the other hand, assume that several factors unfavourable to natural rubber would be operating simultaneously by 1980. These include a technical breakthrough in the production of synthetic polyisoprene which would cut costs of isoprene monomer by, say, half from the 1970 level of 11 to 12 cents per pound. This would lower prices of polyisoprene itself to 11-13 cents per pound which would correspond approximately to the 12-14 cents per pound c.i.f. assumed also in the basic projections for natural rubber. On these assumptions, the price relationship between natural rubber and polyisoprene would be changed so as to favour demand for polyisoprene. On this assumption, considerable quantities of natural rubber would be displaced by polyisoprene, particularly in developed countries. Moreover, polyisoprene would also displace other synthetic rubbers in those uses where these compete with natural rubber mainly on price grounds and where, in the basic projections, such requirements were projected to be met from natural rubber supplies.

765. This set of unfavourable projections also assumes that the centrally planned countries, notably the U.S.S.R., will implement their plans for synthetic rubber, particularly in the case of polyisoprene, capacity for which is planned to increase from 100 000 tons in 1970 to 300 000 tons in 1975. It also implies that developing countries with no or insufficient domestic natural rubber production will tend to follow policies of self-sufficiency, utilizing synthetic rubber from local plants rather than attempting to obtain the best technical properties, particularly in truck tires, through the use of imported natural rubber.

766. Total demand for natural rubber in 1980 on the basic projections favourable to natural rubber is in the range of 4.66 to 4.93 million tons (Table 3). Demand is projected to grow fastest in developing countries and most slowly in developed countries. Consumption of synthetic polyisoprene is projected at 0.35 million to 0.5 million tons, assuming that a normal 80 percent of capacity established will be used by 1980 (Table 4).

^{1/} List prices are generally higher. However, they are quoted "delivered customer", unlike those for natural rubber. Also, discounts are generally given, varying from country to country. Both these elements have been taken into account in the above estimate.

Table 3: Natural and synthetic rubber: Total demand, 1961-63 and 1964-66 averages, 1970* and projections for 1980

	1961-63 average				1964-66 average				1970*				1980			
	natural		synthetic		natural		synthetic		natural		synthetic		natural		synthetic	
	thousand tons	thousand tons	thousand tons	thousand tons	thousand tons	thousand tons	thousand tons	thousand tons	thousand tons	thousand tons	thousand tons	thousand tons	thousand tons	thousand tons	thousand tons	thousand tons
WORLD	2 253	2 724	2 462	3 193	2 386	5 645	4 660	3 935	11 155	11 446	3 767	4 633	12 098	12 346		
incl. China (Mainland)	2 191	2 704	2 312	3 140	2 736	5 575	4 180	3 455	11 035	11 326	3 267	3 613	11 638	12 168		
INDUSTRIAL COUNTRIES	1 450	2 040	1 577	2 774	1 955	4 144	2 794		7 495		2 271			6 076		
North America	491	1 316	566	1 677	618	2 160	502		3 359		741			3 710		
United States	456	1 241	522	1 578	568	2 036	475		3 368		671			3 452		
Canada	35	74	44	106	50	130	77		231		70			258		
Western Europe	676	567	725	841	563	4 021	326		2 619		1 015			2 971		
Belgium-Luxembourg	393	352	408	519	518	2 851	502		1 632		688			1 717		
France	15	17	17	26	28	45	42		70		42			70		
Germany, Fed. Rep. of	128	131	125	150	152	343	210		415		183			443		
Italy	144	132	157	199	206	384	311		659		269			701		
Italy	83	77	87	114	109	193	207		440		166			481		
Netherlands	24	14	22	30	32	23	32		42		27			53		
United Kingdom	169	135	165	183	192	268	269		443		214			478		
Spain	30	17	38	36	51	63	104		194		68			231		
Sweden	22	20	24	24	24	59	36		101		12			125		
Switzerland	16	5	18	18	23	35	35		57		33			66		
Others	47	39	52	51	55	102	75		189		61			204		
Other developing market economies	233	157	286	255	374	592	616		1 267		456			1 427		
Brazil	39	17	27	30	34	82	67		104		59			112		
South Africa	19	17	27	24	29	33	28		57		40			78		
Japan	189	106	298	187	259	490	485		1 084		342			1 287		
INDUSTRIAL COUNTRIES II	268	115	332	190	456	361	756	1 341	1 102	1 393	632	677	1 237	1 557		
Brazil	39	28	30	43	37	75	59		69		37			43		
Argentina	25	17	27	30	29	36	34		37		30			43		
Mexico	34	24	18	33	23	50	43		47		36			54		
India	53	31	64	19	90	37	192		375		122			127		
Turkey	5	2	13	7	20	15	58		67		48			340		
Others	133	34	181	59	257	175	371		456		284			115		
INDUSTRIAL COUNTRIES III	565	569	553	620	675	1 120	1 100		2 568		584			643		
U.S.S.R. and eastern Europe	464	549	423	777	425	1 050	620		2 443		464			503		
Eastern Europe	323	409	240	599	243	720	312		1 822		211			243		
Belgium	142	140	163	218	182	330	288		625		251			361		
Czechoslovakia	7	11	10	13	10	60	13		50		4			100		
Cuba	46	22	46	45	46	65	54		101		52			151		
German Democratic Rep.	24	46	30	55	26	60	27		87		21			51		
Hungary	13	8	16	11	17	18	22		28		14			16		
Poland	37	36	40	54	49	85	67		145		55			158		
Romania	15	15	22	24	35	42	107		171		103			175		
China (Mainland)	101	20	190	43	250	70	480		120		420			120		

*Note: Totals are computed from unrounded data.

Demand for other synthetic rubbers is projected to reach 10.8 to 10.95 million tons. The share of natural rubber in total elastomer consumption is projected to fall only slightly from its 1970+ level, to about 30 percent (Table 5).

Table 4 - Natural rubber, polyisoprene and other synthetic rubber:
Total demand, 1961-63 and 1964-66 averages, 1970+ and projections for 1980

	1961-63 average	1964-66 average	1970+	1980			
				basic		supplementary	
				trend	high	trend	high
(. million tons)							
Natural rubber	2.25	2.46	2.99	4.66	4.93	3.79	4.03
Synthetic rubber:							
total	2.73	3.78	5.65	11.16	11.45	12.03	12.35
polyisoprene ^{1/}	0.03	0.09	0.20	0.35	0.50	1.22	1.40
other synthetics	2.70	3.69	5.45	10.81	10.95	10.81	10.95
Total elastomers	4.98	6.24	8.63	15.82	16.38	15.82	16.38

^{1/} Excluding centrally planned economies

767. On the assumption of the unfavourable supplementary projection, world demand for natural rubber is projected at between 3.8 and 4.0 million tons. Consumption of polyisoprene is projected from 1.2 to 1.4 million tons (based on 80 percent utilized capacity) and that of other synthetic rubbers from 10.8 to 10.95 million tons. The share of natural rubber would continue falling to about 24 percent of total elastomer consumption.

Production projections

768. Only one projection was made for production ^{1/}, because the price assumption made for natural rubber is identical in both the basic and supplementary projections (the difference being in the level assumed for synthetic rubbers). As a consequence, only a single set of responses of natural rubber producers to such a price is assumed. The first stage of the projection (Table 6) of natural rubber output - which assumes continuation of current natural policies and plans affecting rubber production and an evolution of producer prices consistent with the trends in world prices set out in the section on demand - were based on current trends in area and yield, and on actual and planned new plantings and replantings with high-yielding trees expected to mature in 1980, but without taking the effect of the new yield stimulation techniques into account. For lack of precise assessment of the quantitative effect on world output of the use of "Ethrel" ^{2/} and the impossibility of allocating the effects of these factors by individual countries, an estimated conservative increase of 10 percent ^{1/} due to these factors was then added at the second stage to the projected regional output figures which had been derived in the first stage from projection of the production trends of individual countries.

- ^{1/} Releases from government stockpiles in 1980 were assumed to be nil either because objectives had been reached or because governments had disposed of their stocks completely.
- ^{2/} Other factors which may affect output of natural rubber but not to the same extent as "Ethrel" are the introduction of new tapping systems, new methods of latex collection and new varieties which will have been planted up to 1973.
- ^{3/} A study submitted to the FRIM Planters' Conference in July 1970 estimates that, given a certain age structure of rubber trees, an additional 80 000 tons of natural rubber may be produced on Malaysian estates in 1975, by using the new stimulation techniques.

Table 5: -Natural rubber: Shares in total rubber consumption

	1955	1959	1963	1967	1970 ⁺	1980			
						basic trend high	supplemen- tary trend high		
(. Percent)									
<u>WORLD</u>	50.4	52.2	43.3	37.3	34.6	29.5	30.1	23.9	24.6
<u>ECONOMIC CLASS I</u>	59.9	49.6	39.6	33.9	30.9	27.7		22.1	
<u>North America</u>	42.1	34.7	26.2	23.5	22.3	19.1		16.7	
United States	41.5	34.1	25.9	23.1	21.6	18.7		16.2	
Canada	52.4	43.6	30.1	29.5	27.8	25.0		22.7	
<u>Western Europe</u>	88.0	68.0	52.2	42.6	38.1	33.6		27.2	
Germany, Fed. Rep. of	85.3	66.4	51.2	41.3	36.1	32.1		27.7	
France	87.4	66.6	50.2	40.4	36.0	33.6		29.3	
Italy	81.4	62.0	48.9	39.2	36.1	32.0		25.7	
United Kingdom	92.1	69.7	54.0	46.5	41.7	37.8		30.0	
<u>Other developed market economies</u>	92.9	77.2	58.7	47.7	39.1	32.7		24.2	
Japan	95.5	82.2	60.5	47.1	36.4	30.9		21.8	
<u>ECONOMIC CLASS II</u>	91.8	77.9	63.4	60.9	54.5	41.0	42.8	32.0	36.0
Brazil	99.0	82.6	51.2	36.0	33.0	26.2	26.2	16.5	16.5
Mexico	76.7	50.5	36.3	31.9	31.5	27.7	27.7	24.8	24.8
India	99.6	89.9	83.8	71.2	73.8	67.8	67.8	68.6	68.6
<u>ECONOMIC CLASS III</u>	43.5	53.0	46.3	38.5	37.6	30.0		24.1	

769. In West Malaysia about 90 percent of the total acreage planted on estates and 65 percent of that on smallholdings are under high-yielding rubber, and replantings under a government-sponsored scheme continue. Output in Malaysia (excluding possible "Ethrel" stimulation) is accordingly projected to increase by some 65 percent between 1970⁺ and 1980. Replanting in Indonesia started late and on a moderate scale. As a result, a larger proportion of trees is more than 30 years old, and of the replanted trees many have not yet reached maturity. The new First Five-Year Development Plan provides for an expanded programme of replantings, particularly on estates. However, only part of this will affect output by 1980. Coupled with the maturing of already replanted and self-seeded trees and possibly more intensive collection partly owing to higher remuneration of smallholders through more efficient marketing channels, this may result in an estimated increase of production of some 12 percent. In Thailand the rate of replantings and new plantings between 1961 and 1965 (both under and outside the Replanting Aid Fund Scheme) has been much higher than recorded, and output is therefore projected in the first stage to rise by about 40 percent by 1980. In Ceylon, where some progress is being made under the Rubber Replanting Subsidy Scheme, initiated in 1963, and almost half the total acreage

has currently been replanted, an increase of almost 55 percent has been projected. With a rapid expansion of new land under rubber in India, and a replanting scheme introduced in 1957, new high-yielding trees are coming into tapping every year, and a first stage increase of almost 70 percent is expected by 1980. Production in the Khmer Republic and the Republic of Vietnam is much dependent on the further course of hostilities and the progress made in rehabilitating the rubber industry after their eventual end. For Vietnam, double the current production was somewhat arbitrarily projected as output in 1980; for the Khmer Republic only half the level of production before the outbreak of hostilities in early 1970 was taken as the 1980 level, in view of the considerable damage suffered in 1970. Nigerian production is projected to increase by almost half, due mainly to considerable expansion in the estate sector. While output in Liberia is projected to grow at approximately the same rates as in Nigeria, production increases in a number of countries such as Brazil are projected to be more moderate. The aggregate total output, still neglecting the effects of "Ethrel" at this stage, is projected to reach 4.4 million tons in 1980, rising by some 50 percent over the 1970⁺ level (Table 6).

Table 6 : Natural rubber: Production, 1961-63 and 1964-66 averages, 1970⁺ and projections for 1980.

	1961-63 average	1964-66 average	1970 ⁺	1980	
				Use of "ethrel" excluded	included
(. Thousands tons)					
<u>WORLD</u>	2 128	2 359	2 950	4 407	4 800
<u>Far East</u>	1 948	2 161	2 704	4 032	4 400
Malaysia	833	951	1 300	2 130	
Indonesia	649	694	800	900	
Thailand	190	215	235	485	
Ceylon	102	120	162	250	
India	32	49	89	150	
Vietnam	75	61	26	50	
Khmer Rep.	41	49	14	25	
Others	26	23	28	42	
<u>Africa</u>	152	163	216	321	340
Nigeria	62	71	75	110	
Liberia	43	49	72	100	
Congo, Democratic Rep. of	38	28	41	55	
Ivory Coast	0	4	12	23	
Cameroon	9	11	12	20	
Others	0	2	4	13	
<u>Latin America</u>	29	34	30	54	60
Brazil	22	27	23	35	
Others	7	7	7	19	

Note: Totals are computed from unrounded data.

770. Provided no deleterious long-term efforts will emerge, the currently still expensive and scarce latex flow stimulants may be cheaper and more readily available ten years from now and their use more widespread, although their application will probably vary greatly from country to country. As stated above, a conservative average estimate of some 10 percent increase was then applied for each region, raising world output to between 4.8 to 4.9 million tons in 1980. The figure of 10 percent implies that producing countries do not use the new technique to its limit and/or that a number of estates prefer to reduce the labour input to increasing yields. A full exploitation of its potential could well result in higher additional output.

Comparison with previous projections

771. The 1966 projections for 1975, which assumed constant natural rubber prices, projected a considerable notional surplus of production over demand, indicating the possibility of severe pressure on prices. In fact, the trend of natural rubber prices has been clearly downward since the early sixties. Two decisive factors determining supply and demand of natural rubber have emerged since the last projections were made: the development of latex flow stimulation techniques on the supply side, and intensive competition from a near-identical synthetic rubber on the demand side, which had only just been introduced in the market at the time of preparation of the last projections. The new latex flow stimulation techniques are given predominant importance in the basic projections for 1980, implying a more favourable price/cost outlook for natural rubber than in the previous projections, while in the supplementary projections a technical breakthrough in polyisoprene production is assumed to be the decisive factor which could bring about an unfavourable 1980 situation for natural rubber, though even this set of assumptions do not imply quite as pessimistic an outlook for the latter as in the previous projections.

772. With the experience of actual growth rates of demand since the last projections were made and the fact that by 1970 actual consumption of natural rubber had exceeded the low demand projected for 1975 in the last exercise by some 10 percent, demand for natural rubber is assumed to grow at considerably higher rates in the basic and moderately higher rates in the supplementary projections than in the previous projections. Higher rates are also projected for output, in view of the new yield stimulation techniques, which are assumed to have considerable effects in both alternative projections.

Issues arising from confrontation of demand/production projections and implications for trade

(a) Overall balance

773. On the basic projection, world production and demand balance in 1980, output at 4.8 million tons lying in the middle of the range projected for world demand (4.66-4.93 million tons). The new yield stimulation techniques could provide flexibility for some downward or upward adjustment of production at the projected lower levels of natural rubber prices. Despite this lower level of prices, this projected situation is considered to be a basically favourable one for natural rubber producers.

774. The assumption of the supplementary demand projections, however, which lead to a considerably lower demand than the basic projections, imply a potential world surplus of natural rubber in 1980. This might not be fully cleared by a downward adjustment in price owing to the determination of end-use patterns largely on technological grounds and to captive market considerations, and would involve extremely serious problems for producing countries.

(b) Implications for trade

775. Since natural rubber is, and in 1980 will still be, grown primarily for export (less than one tenth of world output is currently processed in the producing countries themselves), any imbalance between supply and demand by 1980 will express itself as a surplus or deficit of export availabilities over import requirements. The basic projections of production and demand show a volume of international trade in natural rubber between 4.04 and 4.25 million tons; exports and imports would thus remain in balance on these assumptions (Table 7), at a level of trade 45 to 55 percent higher than in 1970⁺, and export earnings would remain at about the 1970⁺ level of some U.S. \$ 1 200 million.

Table 7 - Natural rubber: Export availabilities and import requirements, 1961-63 and 1964-66 averages, 1970⁺ and projections for 1980.

	1961-63 average	1964-66 average	1970 ⁺	1980
(. Thousand tons)				
<u>Far East</u>				
Production	1 948	2 161	2 704	4 400
Consumption	145	188	271	460 to 650 ^{1/}
Net exports	1 886	2 044	2 550	3 750 to 3 940
<u>Africa</u>				
Production	152	163	216	340
Consumption	4	15	17	40 to 56
Net exports	150	162	195	294 to 309
<u>Total net exports</u>	2 036	2 206	2 745	4 044 to 4 249
<u>Rest of the world</u>				
Production	29	34	30	60
Consumption	2 104	2 259	2 698	4 160 to 4 229 ^{1/}
Government stockpile releases	64	128	31	-
Net imports				
Developed market economies	1 338	1 483	1 910	2 794
Centrally planned economies	564	555	675	1 100
Latin America and Near East	94	97	129	206 to 275
<u>Total net imports</u>	1 996	2 136	2 714	4 100 to 4 169

Note: Totals are computed from unrounded data.

^{1/} Basic demand projections

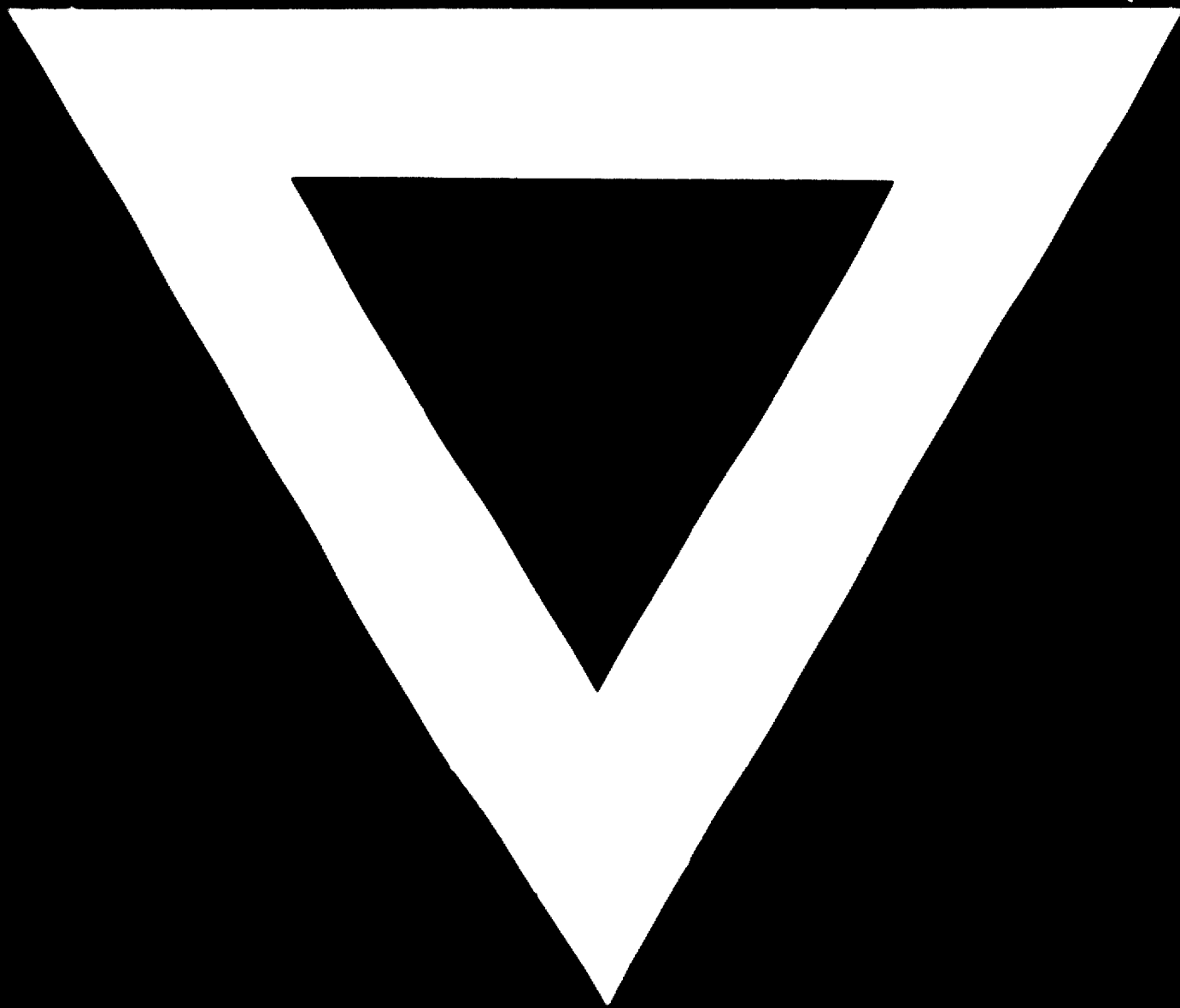
776. On the assumption of a change in cost and price relationships in favour of polyisoprene, however, export availabilities of natural rubber would exceed import requirements, implying that producing countries may have to face price falls on world markets even beyond those assumed, and/or a tendency toward surpluses.

(o) Policy issues

777. Very little is yet known of the actual effect of "Ethrel" use in the longer run. If a major change in price/cost relationships occurs favouring accelerated production of natural rubber, an extensive use of latex flow stimulants could result in a much higher output than assumed in the basic projections (if the present indications that rubber trees will not suffer from this technique are borne out). This could lead to over-production, a possibility that could become a serious problem on the assumptions of the supplementary demand projections which were deliberately kept unfavourable to natural rubber in order to pinpoint the issues facing natural rubber producers and which would imply a tendency toward a supply/demand imbalance even without the additional production resulting from yield stimulants. In this case close cooperation between countries to control production and to organize exports could at some stage prove necessary.

778. A technical breakthrough in the production of isoprene monomer may or may not materialize. If it does not materialize, as assumed in the basic projections, there will nevertheless be downward movements in polyisoprene prices (and therefore, because of the nature of the market, in natural rubber prices) resulting from economies of scale in the output of polymer, and from the existence of captive markets. If a technical breakthrough does materialize as assumed in the supplementary demand projections, the extent of cost savings may or may not be large enough to offset those achieved by using "Ethrel" in natural rubber production.

779. In both cases, however, projections indicate that there is still a pressing need to continue efforts to lower costs and raise productivity in natural rubber production if only to prevent heavy investment in polyisoprene capacity which, once established, will in all likelihood be used. However, if these efforts are implemented successfully, natural rubber producers could well look forward to retaining most of their present share of an expanding world elastomer market, and to a significant absolute increase in the volume of their exports, with export earnings well maintained.



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