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WORKING PAPER NO. 692

DIMENSIONS OF THE GLOBAL PROCESSING TOMATO INDUSTR

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This paper considers the capability of the world processing tomato industry to expand tomato paste production without requiring substantial new capital investment. It responds to concerns about a return to the depressing oversupply conditions of the last few years. We conclude that such a danger exists because there is a current global overcapacity of 5 million metric tons of raw product beyond 1993 input levels. Attempts to utilize this capacity, *without a corresponding increase in consumer demand*, would depress paste prices once again below profitable levels. Our analysis focuses on supply side issues only, and not on potential demand changes.

Worldwide Processing Tomato Production by Country

The U.S. Foreign Agricultural Service (FAS) estimates that 1993 production of tomatoes for processing in major producing countries will reach 16.6 million tons (all figures metric unless noted). The list of countries omits other producers of significance including Canada, Argentina, Brazil, Chile, Australia, Russia, China, and other former Eastern bloc countries, many of whom are not active in global trade. We believe that these added countries will require an added 8 million tons of tomatoes for processing.

Principal producers for the world market in the FAS list are projected to be the United States, 8.9 million tons; Italy, 3.4 million tons; Turkey, 1.1 million tons; Greece, 1.0 million tons; and Spain, 0.8 million tons. Other significant producers are expected to be Portugal, 0.4 million tons; Mexico, 0.4 million tons; Israel, 0.2 million tons; and Taiwan, 0.1 million tons.

Practices differ from country to country as to what proportion of the total tomato crop is allocated to processing. The share tends to be large in the United States and Canada, and relatively low in important fresh-market producing countries such as Spain and Turkey. For the period 1988-90, the share of the total tomato crop grown or diverted for processing in OECD countries was 61.0%. Among the member countries, however, percentages for principal tomato producers varied widely: Netherlands, 0.0%; Turkey, 30.4%; Spain, 31.4%; Japan, 34.8%; France, 40.5%; EC-12, 53.1%; Portugal, 64.4%; Greece, 65.4%; Italy, 71.7%; United States, 83.8%; Canada, 84.9%. In the U.S., from 55 to about 60% of processing tomatoes are used for paste, with the rest going into canned tomatoes, sauce, juice, and other processed products.

Tomato Production and Processing

Some substantial increases in tomato processing and trade occurred between 1987 and 1992 in the principal producing countries (Table 1). The volume of tomatoes used by processors increased by 1.7 million tons (11.5%), the production of

paste expanded by 307,000 tons (21.0%), and paste exports of the selected countries grew by 141,000 tons (20.3%). The growth in paste production and trade appears moderate, averaging only 4% per year. But the appearance is deceptive because within the period, all three categories rose even higher before declining to their 1992 level. In particular, processing tomato production exceeded 18 million tons during each of the three years from 1989 to 1991, with a peak in 1990 of nearly 19 million tons, 3 to 5 million tons greater than the levels in either 1987 or 1992. This built up the enormous supplies that contributed to the price crash following 1989, when California f.o.b. prices plummeted from 60 cents per pound to 27 cents in a period of 3 years. It is interesting to note, however, that despite the dominant size of the U.S. paste industry, it only accounted for about one-third of the growth in paste production between 1987 and 1992. Turkey accounted for 29 percent of this growth and Italy for 26 percent.

TABLE 1. PROCESSING TOMATO AND TOMATO PASTE PRODUCTION AND EXPORTS, LEADING PRODUCER COUNTRIES, 1987 AND 1992.

	PROCESSING TOMATO PRODUCTION		TOMATO PASTE PRODUCTION		TOMATO PASTE EXPORTS	
COUNTRY	1987 m. tons	1992 m. tons	1987-88 m. tons	1992-93 m. tons	1987-88 m. tons	1992-93 m. tons
United States *	6,896,000	7,962,000	*675,000*	*780,000*	9,269	73,000
California	6,080,387	7,195,788	*595,000*	*705,000*		
Italy	3,100,000	3,200,000	220,000	301,000	230,000	250,000
Turkey	900,000	1,500,000	140,000	230,000	103,577	156,158
Greece	865,000	985,000	146,078	155,476	190,000	175,000
Spain	743,000	768,000	57,000	94,700	35,500	62,000
Portugal	427,000	447,000	77,800	84,559	95,100	101,629
France	236,000	249,000	31,071	35,266	4,635	1,400
Israel	178,000	143,000	14,600	*11,700*	8,700	
Taiwan	278,000	133,000	*22,000*	*11,000*		
Mexico **	271,000	52,000	30,578	*7,500*	15,284	8,774
Canada ***	478,000	*585,000*	*47,000*	*57,000*	*3,200*	*8,600*
TOTAL	14,372,000	16,024,000	*1,461,127*	*1,768,201*	695,265	836,561

* Export figures are for calendar years 1987 and 1992.
** 1992-93 production figure estimated from 1991-92 ratio. Exports are for CYs 1987 and 1992.
*** Paste production and exports estimated from OECD data.
Italics indicate wholly or partially derived estimate.

Sources: USDA-FAS; FATUS; California Agricultural Statistics Service.

Production results varied between countries. Processing tomato production increased significantly in the United States, 1 million tons (15%); Turkey, 0.6 million

tons (67%); less so in Greece, 0.1 million tons (14%), and Canada, 0.1 million tons (22%). Increases were marginal in most other countries except for Israel, Taiwan, and Mexico, where production declined. As for tomato paste, the United States increased production by around 105,000 tons (16%), Turkey by 90,000 tons (+64%), Italy by 81,000 tons (+37%), and Spain by 38,000 tons (+66%). Much of the production was for export markets: United States exports were up by 64,000 tons, Turkey by 53,000 tons, and Spain by 27,000 tons.

Countries also vary in the solids content of tomatoes used for making paste and in the efficiency with which the process takes place. This is reflected in the conversion rates applying to the major countries (Table 2).

TABLE 2: TOMATO CONVERSION RATIOS FOR 28-30 BRIX PASTE
(1992-93 and forecast 1993-94, or as indicated)

COUNTRY	CONVERSION RATIO	AVERAGE SOLUBLE SOLIDS
Italy	5.3:1	5.5
Turkey	6.1:1 - 6.6:1 (1991-92, 1992-93)	4.75-4.39
Greece	5.6:1	5.17
Spain	5.6:1	5.2
Portugal	5.2:1 - 6.1:1 (1991-92)	5.57-4.75
France	5.3 - 5.4:1	5.5-5.37
EC	5.8:1 (1988-89)	5.0
Mexico	6.5:1 N. - 7.0:1 S.; 7.4:1 (1988-89)	4.46-4.14; 3.9
Argentina	7.0:1	4.14
Brazil	6.7:1	4.33
Chile	5.8:1	5.0
Israel	5.9:1 (1988-89)	4.9
Taiwan	7.4:1 (1988-89)	3.9
United States	5.4:1 (CTGA)	5.4

Source: OECD; authors' estimates; California Tomato Growers Association.

Where no specific conversion rate is available, OECD uses a general baseline rate of 6.2:1. The California Tomato Growers Association uses a conversion rate of 5.86:1 for 31 brix paste, which assumes 98% plant efficiency. This is equivalent to a conversion ratio of 5.4:1 for 28-30 brix paste without loss, the standard used for other estimates in Table 2. The major inference from Table 2 is that the newer-producing countries such as Brazil, Argentina and Mexico, and to a lesser extent Turkey, have room to improve the quality of their processing tomatoes.

CHART 1:
TOMATO PASTE GROWER—PROCESSOR PRICE SPREADS
UNITED STATES, 1980-1993

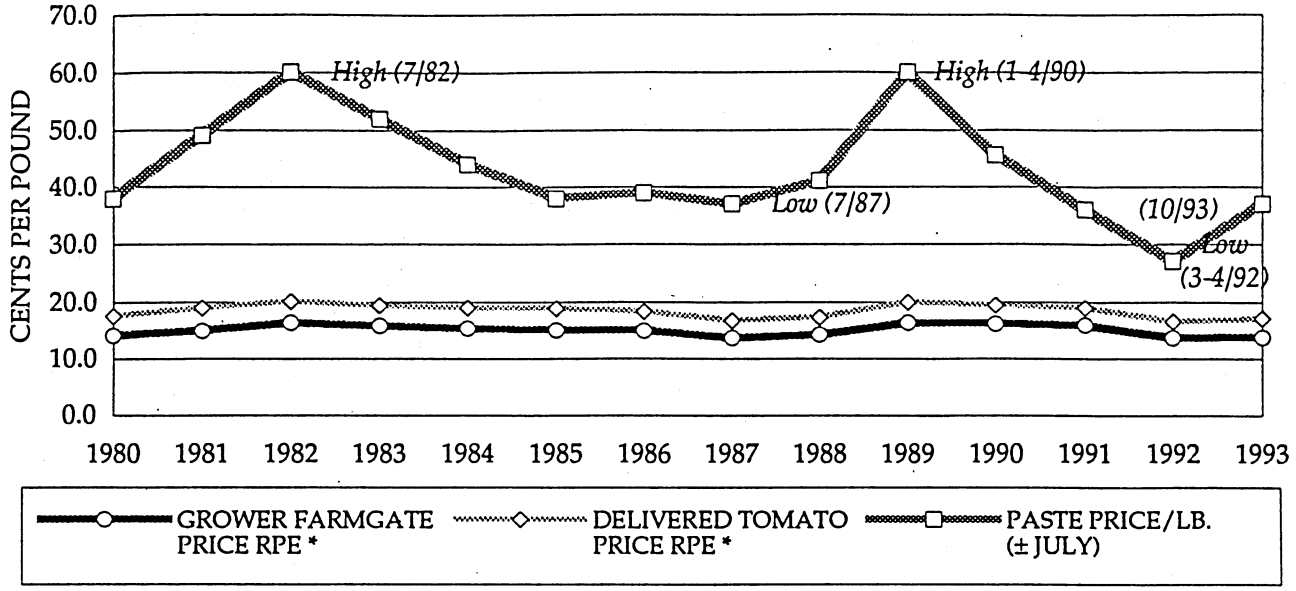
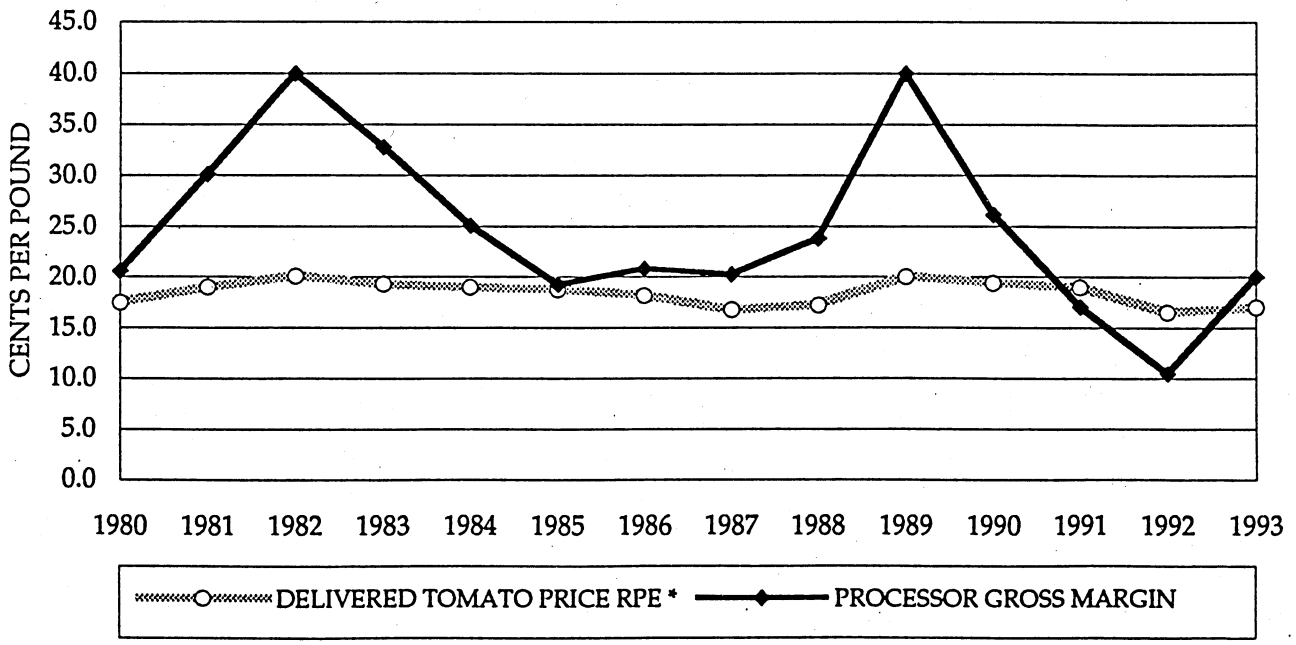


CHART 1a:
TOMATO PASTE: DELIVERED TOMATO PRICES AND PROCESSOR GROSS MARGINS, CALIFORNIA, 1980-1993



* RPE = Raw Product Equivalent—Price of 5.86 lbs. Tomatoes Processed to 1 lb. Paste.
1993 prices are preliminary estimates.

Pricing Cycles: the Relationship Between Grower and Paste Prices

The profits available to processors are important in explaining industry expansion. In the absence of information on industry profits, we have analyzed the gross margin available to processors, that is, the difference between what they pay for tomatoes and what they receive for paste. This analysis shows that margins have been highly variable, in fact more variable than either paste or grower prices (Chart 1a). But they were also profitable for much of the period relative to the margin needed for a modern paste specialty plant. The estimated margins averaged at or above 20 cents per pound ($441 per ton) in all years between 1980 and 1990 in California except in 1985 when they were about 19 cents per pound. Such margins are adequate to cover at least full costs of processing in a modern plant. They become inadequate, depending on plant characteristics, as they go below 20 cents per pound, as they did in 1991 and 1992. Margins are expected to be more profitable in 1993.

When grower prices are converted to a price for the quantity of tomatoes needed to make one pound of paste, they show a remarkable stability relative to paste prices (Chart 1). The paste price is the California wholesale price for bulk industrial tomato paste, for July or other month as noted. The grower price has been converted from dollars per ton to cents per 5.86 lbs.—the average quantity of fresh tomatoes required to produce one pound of tomato paste (30-32 Brix) in California, including losses. These data are not precise, since the paste price is for one month only, but they are adequate indicators of the differences in price volatility.

We find little evidence of a lagged correlation between the grower and processor price cycles. Thus, we find no way of projecting what grower or processor prices will be in the future based on knowledge of what they are today. In 9 out of the 13 years observed, grower and processor prices moved in the same direction, and in 4 years, they moved in opposite directions, but very weakly. The more important phenomenon is the relative stability in grower prices.

This stability in California arises primarily because of the way the market for processing tomatoes is structured. Essentially, price is determined through bargaining between individual processors and the California Tomato Growers Association, representing a substantial majority of growers selling to about 25 proprietary processors. This process establishes price and other parameters for contracts which are subsequently negotiated between individual processors and growers. The bargaining is intense because processors still control the amount that they will buy and can choose, in many cases, to import paste. This type of market structure favors stable prices for sellers (growers) and places almost all finished product price risks with the buyers (processors).

The processors' market for finished tomato paste is more diverse than that of growers for raw tomatoes. The tomato product market consists of a wide array of remanufacturers, domestic food services, and other wholesale and retail customers, buying both through contracts and at spot prices. Internationally, this product market is further served by export trade with Canada and East Asia, and by imports from Mexico, Chile, and other countries. This market is more competitive than that for raw tomatoes because of relatively larger numbers of buyers and sellers. In consequence, paste prices (Chart 1) display more volatility than raw tomato prices: higher peaks, lower troughs, and a possibly greater frequency of each. A similar relationship occurs in the EC where minimum grower prices, established politically, tend to be much more stable than paste prices.

The coefficient of variation measures the relationship between average prices and their variability. A high value indicates greater variability than a low value. Applying this measure to California prices shows that the coefficient for raw tomatoes is 6.5%, an indicator of stable prices, and the coefficient for paste is 21.0%, suggesting that paste prices are 3.25 times more volatile. The coefficient for processor margins is over 50% higher than for paste prices, indicating the high degree of uncertainty about margins. These measures support the conclusion that processors are unsuccessful in shifting their price risks back to growers in the short term.

Industry Structure and Capacity Estimates by Country

We estimate that global full-season engineered capacity for producing tomato paste is 25.2 million tons of raw product, or approximately 4.2 million tons of paste (Table 3). This estimate is for capacity in principal producing countries and is calculated as the 3-shift daily capacity times the average number of days per season. Where data permits, we have estimated plant numbers and their distribution by size and average production per plant. This suggests that there are approximately 635 paste-producing plants in the principal producing countries, and that the median engineered capacity of these plants is less than 30,000 tons of tomatoes per season.

Capacity estimates in the table are those available, derived, or otherwise calculated from Amitom, USDA-FAS, EC, and our own data on the various paste-producing countries. The various estimation approaches as well as problems with these approaches are explained below.

The capacity estimate for Greece was derived from information about the EC production quota allocated to Greece, and the relationship between EC quotas and estimated capacity in Italy, France, Spain and Portugal. The capacity-quota ratios were then used to compute and aggregate capacities for the hundreds of identified paste-processing plants in the five EC producer countries.

TABLE 3: STRUCTURE OF WORLD TOMATO PASTE INDUSTRY, 1992-93
Full Season Engineered Capacity, Metric Tons, Fresh Equivalent Basis

Size in 000's MT	Over 200	150-200	100-150	50-100	30-50	10-30	0-10	Total
Italy: Plants		1	2	7	19	48	167	244
Total Capacity		172,122	266,860	501,120	728,172	880,972	450,781	3,000,027
Avg. Capacity		172,122	133,430	71,589	38,325	18,354	2,699	12,295
Greece: Plants		1	5	5	4	8	19	42
Total Capacity		160,683	578,993	321,747	157,757	156,858	68,165	1,444,202
Avg. Capacity		160,683	115,799	64,349	39,439	19,607	3,588	34,386
Spain: Plants			2	5	2	5	18	32
Total Capacity			242,913	348,394	84,742	85,399	38,554	800,003
Avg. Capacity			121,457	69,679	42,371	17,080	2,142	25,000
Portugal: Plants			1	3	9	7	6	26
Total Capacity			111,712	218,148	351,311	155,206	35,335	871,711
Avg. Capacity			111,712	72,716	39,035	22,172	5,889	33,527
France: Plants			1		1	4	11	17
Total Capacity			120,514		37,058	92,495	28,933	279,000
Avg. Capacity			120,514		37,058	23,124	2,630	16,412
EC-12: Plants		2	11	20	35	72	221	361
Total Capacity		332,805	1,320,993	1,389,409	1,359,039	1,370,930	621,767	6,394,943
Avg. Capacity		166,403	120,090	69,470	38,830	19,041	2,813	17,715
Turkey: Plants *	2	3	2	3				37
Total Capacity	474,147	528,536	249,540	276,853				2,200,000
Avg. Capacity	237,074	176,179	124,770	92,284				59,459
United States *								9,620,074
Calif.: Plants *	19	6	4	3				32
Total Capacity	7,041,204	1,035,236	496,937	269,760				8,872,374
Avg. Capacity	370,590	172,539	124,234	89,920				277,262
Canada *								4
Total Capacity								430,000
Avg. Capacity								107,500
Mexico **: Plants	1		2	2	2	1	1	9
Total Capacity	216,000		234,000	144,000	81,000	22,500	9,000	720,000
Avg. Capacity	216,000		117,000	72,000	40,500	22,500	9,000	80,000
Argentina **: Plants					3	24	14	41
Total Capacity					120,020	434,190	93,545	650,000
Avg. Capacity					40,007	18,091	6,682	15,854
Brazil **: Plants *			2	7	2			12
Total Capacity			256,700	532,800	70,000			900,000
Avg. Capacity			128,350	76,114	35,000			75,000
Chile **: Plants		2	3	4	1			10
Total Capacity		334,021	333,932	259,794	37,113			1,000,000
Avg. Capacity		167,010	111,311	64,948	37,113			100,000
Other ***: Plants *	NA	1	NA	7	11	57	22	129
Total Capacity	NA	180,000	NA	487,503	414,200	844,904	103,528	3,245,970
Avg. Capacity	NA	180,000	NA	69,643	37,655	14,823	4,706	25,163
World: Plants *	22	14	24	46	54	154	258	635
Total Capacity	7,731,351	2,410,597	2,892,102	3,360,119	2,081,372	2,672,524	827,840	25,160,986
Avg. Capacity	351,425	172,186	120,504	73,046	38,544	17,354	3,209	39,624

* Size distribution data not available for all plants.
Some additional aggregated data: Turkey—25 "large", 12 "small" plants; Canada—4+ plants.
** Latin America data is for 1990, without updates, from Moulton and Garoyan (1991) and Moulton (1991).
*** For names of countries included in this category, plus additonal comments, see text.
Sources: EC 1991 Quotas; FAS Attache Reports & Horticultural Products Review; Tomato News (Amitom); Garoyan and Moulton; Moulton; Moulton and Garoyan; OECD.

For the United States, our principal reference was a 1991 capacity estimate made by the Morning Star Company. This was adjusted for estimated plant closures since 1991 and compared with similar estimates from Durham, CTGA, and other industry sources. For the rest of the U.S. as well as for Turkey, Canada, and the major Latin American producers, we have used OECD estimates as well as those in our previous studies.

A number of countries with low output levels are included in the "other" category. Included are Venezuela, Peru, Israel, Taiwan, the Philippines, Cameroon, South Africa, Australia, New Zealand, and a group of Arabic and other Islamic countries, particularly Algeria, Tunisia, Egypt, and Morocco.

Several countries are excluded because of inadequate information. For the most part, they have little influence on world trade in tomato paste. In this group are the countries of eastern Europe and the former Soviet Union. For countries included in the "other" category, and to a lesser extent for Turkey, Canada, mid-western U.S., and major Latin American producers, information on the capacities of specific plants is scarce, incomplete, or based on estimates and projections made in different years from 1988 to the present. Thus interpretations based on data from this category should be treated with appropriate caution.

Full season capacity estimates disregard the seasonal pattern of tomato supply and the breaks in operation caused by equipment or personnel problems. We estimate that such constraints result in a practical operating capacity of 65 to 70% of the full season operating capacity.

Richard Sexton notes that the California industry has moved in two directions to better utilize plant capacities: (1) the harvest has been extended in some cases up to 20 weeks, and (2) some plants use non-harvest weeks to remanufacture paste into other products.

Four countries or groups of countries control over 85 percent of active world capacity for tomato paste: the U.S. (mostly California), 38%; the EC, 25%; the major Latin American producers, 13%; and Turkey, 9%. California and the EC together have 61% of world capacity; California and Italy, 47%.

It is difficult to assess how the former East Bloc countries we do not include would affect world capacity. Using what data we could assemble on past and current tomato and tomato products production, and using a series of assumptions about tomato utilization and the continuation of past relationships, we believe that these countries would add perhaps 8 million metric tons of capacity, or 32%, to the world total. This impressive figure depends on assumptions, extrapolations, and comparisons that are all subject to debate. Even if the estimate were to prove reasonably accurate, the impact of it on the world market remains far more modest

than its magnitude would suggest because their production is mostly consumed domestically.

Even with missing or partial data for many countries, the structure of the processing industry shows some contrasting patterns. Most notably, production in California is concentrated in relatively large operations. Elsewhere in the world, only a handful of plants even approach the scale of the modal California size class. From the limited information available on the Turkish industry, capacity there appears to come closest to the California pattern. Among other large producers, the opposite extreme is best represented by Italy, where two-thirds of the plants are in the smallest size category and nearly 90 percent are in the bottom two. The dominant size of the Italian industry imposes much this same pattern on the entire EC structure, though plants in the other four countries also tend to cluster toward the low end of the size range.

In Latin America, Argentina resembles the Italian pattern while Chile more closely follows the California one. Despite data limitations, plants in Mexico and Brazil seem to be rather evenly distributed across the size range. Otherwise, as in the case with Turkey, structural data are too sketchy for definitive commentary. The processing plants in countries contained in the "other" category tend to be small. Since most capacity analyses focus on mid-size to large units, the number of extremely small plants in these countries may, if anything, be understated. The size of paste manufacturing plants is important because smaller plants tend to have higher unit costs and more variability in paste quality.

Definitions and Assumptions About Capacity

The level of paste output depends on capacity per unit of time, and the amount of time the facility is used. There is no simple and consistent way to measure capacity or its use since it involves a number of variables:

(a) Tons of fresh tomatoes processed (per line; per plant; per district, zone, or region; per country, etc.) per hour in operation;
(b) Hours in operation (one shift, two shifts; high season, shoulder and low seasons);
(c) Days in operation (seven-day week; six-day; sliding-length week according to processing demand; etc.);
(d) Weeks in operation (full season; variance by locality, by crop weather conditions, by proximity and power of competition, etc.; degree of dependence on local tomatoes; willingness to transport tomatoes for long distances from earlier or later producing areas);
(e) Estimates of equipment downtime; capability to vary speed of line operation, size and nature of packaging, etc.;
(f) For finished product capacity, conversion ratios of fresh equivalent tomatoes.

If there is any single incontrovertible indicator of *overcapacity*, it would have to be the existence of plants not utilized but capable of operation during the season—especially if these remain closed at the height of the season and for longer than one year. When a plant is operating, we assume it operates as close to engineered, installed, or optimal processing capacity as possible. This attainable or practical capacity probably approaches theoretical capacity only during a few peak weeks of the season; although with early, mid-season, and late crops, processors in certain countries manage to run at peak utilization for all but a few weeks of their harvests.

Over the entire processing season, utilized capacity in the paste industry is generally thought to average around 67%; for individual countries, estimated utilization rates run from as low as 40% to as high as 70% or, in exceptional instances such as Israel, even 85%.

Catherine Durham asserts that the theoretical season capacity for California can be calculated on the basis of maximum weekly capacities, which in turn, can be closely approximated from records of the quantities of tomatoes processed or delivered for processing during the four to five peak weeks of the season. Using this method, she estimated seasonal California capacity for 1989 at 7,520,000 tons of raw product. Other industry sources, presumably using methods rather similar to Durham's, have derived a comparable 1989 capacity figure of 7,588,000 tons.

In 1991, the Morning Star Company estimated that the engineered capacity for production of tomato paste in California was then 3,634 tons of raw product per hour—the equivalent of 9,158,137 tons for a season of 2,520 hours (105 days). This source indicates that two plants have since closed, reducing capacity by 285,763 tons to a 1993 total of 8,872,374 tons, or an operational capacity of about 5.9 million tons. The increase in installed capacity reflects investment decisions based on price signals and favorable weather that had already resulted in rising supplies of processing tomatoes.

The publication of data on the utilization of tomatoes for producing tomato paste in the United States was discontinued in 1988. Therefore, we rely on the estimate of the California Tomato Growers Association that 55 to 60 percent of tomatoes delivered to processors since 1988 have been processed into paste. Using the midpoint of that range, or 57.5 percent, we calculate that the quantity of tomatoes used for paste production was 4.4 million tons in 1989, 5.2 million tons in 1991 and 4.6 million tons (expected) in 1993. Based on the gross paste capacity estimates cited above, we calculate that capacity utilization has declined from 58.6 percent in 1989, to 56.5 percent in 1991 and to 52.1 percent in 1993.

If we assume that operational capacity amounts to two-thirds of gross theoretical capacity (thus accounting for seasonal patterns of tomato deliveries, as

well as downtime for equipment), utilization still shows a downturn between 1989 and 1993, and an increase of about 660,000 tons in unused capacity. The operational capacity for 1993, 5.9 million tons, exceeds the record level of input achieved in 1991 by 0.8 million tons.

Our estimate of excess capacity is approximate and is obviously influenced by the total supply of tomatoes to be processed and by our assumptions about the portion allocated to paste production. Yet whatever the nature of the calculation, we cannot escape the reality that since 1989, processing capacity in California has expanded more rapidly than paste production, even with recent closures. This creates the potential for expanding production of raw product in the state by 1.3 million tons beyond the level expected in 1993 without a significant increase in investment.

Bieche has suggested that EC quotas generally equate with capacity, perhaps with varying conversion ratios for particular countries. It may well be reasonable to assume that quotas are consistently proportional to capacity, although we have not come up with any explanations for this. The possibility always exists that especially powerful and influential firms can win quotas closer to their full capacities than their ordinary pro rata share would get them.

Other technical variables with some bearing on capacity include age of equipment; degree to which aging, reconditioned, and new equipment has been installed and/or integrated; source countries and firms for equipment; and—in terms of pure functionality—speed of operation, variability of speeds, and propensity for breakdowns. While acknowledging these factors, we have not been able to estimate their impact on our calculations.

Outlook and Implications

With the preceding background, it is possible to forecast world tomato paste processing *overcapacity* for the 1993-94 marketing year. If FAS is expecting 16.6 million tons of processing tomatoes from the principal producing countries, and if the other processing tomato countries (not including, in the main, the former Eastern bloc) add to the total in the same relative proportion as their aggregate capacity has to total capacity (24.8%), we foresee a total processing tomato crop of somewhere around 20 million tons. At 60% utilization for paste, this would provide 12 million tons of tomatoes for paste processing. Since we calculate theoretical world capacity at 25.2 million tons and operating capacity at 16.9 million tons, this indicates an overcapacity in 1993 of about 5 million tons, or 30% of operating capacity.

Some countries may not find it feasible to improve capacity utilization very much. For example, Mexico is hindered by raw product constraints. Chile, in contrast, has modern, efficient farms and plants in place already and requires only

the relaxation of tariffs or other economic incentives to expand production significantly.

Our impression is that many if not most people in the tomato industry do not talk or think about capacity in a global sense. Of those who do, few have much to say about how capacity is calculated—except to note units such as tons of fresh tomatoes per hour, day, week, or season, along with length of season. Their most nuanced comments refer to shoulder seasons, quality of equipment, plant shutdowns, and the like. Perhaps the best—and possibly the only—way to assess capacity in a thorough way is to conduct painstaking detective work in the field for all producer countries.

Our estimate of total world tomato paste manufacturing capacity derived from the analysis presented in this paper, shows that there is significant unused capacity of approximately 5 million tons. Attempts to utilize this volume would result in vastly greater production of tomatoes and, without a corresponding increase in product demand, would depress paste prices once again below profitable levels.

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