AN ANALYSIS OF ALTERNATIVE MARKETING PROGRAMS FOR THE TART CHERRY INDUSTRY

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L. L. Boger (L.L. Boger)
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ABSTRACT

AN ANALYSIS OF ALTERNATIVE MARKETING PROGRAMS
FOR THE TART CHERRY INDUSTRY

by Dennis Lee Oldenstadt

Producers of several agricultural commodities are engaged in or considering joint-marketing programs as a means of increasing net revenue. There is a wide range of alternative programs to consider. The programs are complex and their potential costs and returns are often unknown. The general objective of this study is to categorize alternative marketing programs into five groups according to where their influence registers in the supply and demand complex of the market. The specific objective is to then apply this framework to analyzing alternative marketing programs for the tart cherry industry. Price and income effects are measured to provide some estimates of the merits of the alternative marketing programs.

An estimate of the demand for all processed tart cherries (excluding tart cherry pie filling) was made at the processor level and extended to the grower and retail levels by applying appropriate margin data. The factors affecting tart cherry supplies were discussed. Demand estimates were used as the basis for determining price and income effects of the alternative marketing programs.

An expanded tart cherry promotion program was considered as the first program affecting tart cherry demand.

It was determined that an increase in per capita demand of .1 pound per capita (about the quantity of tart cherries in one piece of pie) would be expected to increase total annual revenue at retail by between one and three million dollars. The cost of meeting the promotional objective was not estimated, but net revenue would equal the difference between total returns and total costs of the program.

New product development programs and government purchases and diversion were considered for their effect on the demand for tart cherries.

Six alternative programs for affecting tart cherry supplies were considered. These include market information, quality control, vertical coordination, surplus disposal, surplus set-aside and market diversion.

Reduction in tart cherry supplies available for market was found to have different results on price and revenue depending on the size of the total supply and the level of the market. The estimated price elasticity of demand was greater than one at the processor and retail levels indicating that supply control programs would reduce total revenue at these levels. The demand at the producer level, however, was found to have both an elastic and an inelastic segment in the relevant range. This indicates that producers total revenue could be increased through supply control programs particularly if the potential crop and total supply were very large. It was estimated that if total supply was reduced from 351 million pounds to 334

million pounds total revenue available to producers would increase about 693 thousand dollars.

The effect of price bargaining between the tart cherry growers group and processors was briefly considered along with a transportation model for their influence on reducing marketing costs.

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Dennis Lee Oldenstadt

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CHAPTER I

INTRODUCTION

Problems and Background

Several commodity groups in the United States have reached a stage in the development of their industry where it has become necessary to integrate and rationalize the several programs, policies and actions currently underway or being proposed. Such is the case in the tart cherry industry in 1964. Tart cherry producers have undertaken self-help programs of organization, education and evaluation and have reached the point where further actions will require progressively more complex analyses and intensive study. Each step in the decision-making process will require more information and discussion than previously when the programs and actions being considered were relatively uncomplicated and appropriate actions were more obvious.

Of course a free market where producers do not attempt to influence demand or supply is a possible alternative to a more highly organized marketing program. This alternative is, in fact, currently being advocated by some members of the tart cherry industry. However, the more vocal or communicated point-of-view among growers appears to be toward studying

and evaluating more complex marketing programs.

Several characteristics of the tart cherry industry are associated with the desire on the part of producers to consider more complex marketing arrangements. First is the nature of production which has fluctuated up and down from one year to the next precipitating wide swings in price and producers' income. Fluctuating production has created an unstable carryover inventory in some years which adds to price instability. In other years of short supply, carryover inventories have been too small to adequately fill the marketing channels or so-called pipe-lines resulting in shortages in the markets.

Fluctuations in production have also made it difficult to expand the foreign market for tart cherries. A foreign customer is reluctant to attempt a marketing program or to introduce a product line involving tart cherries unless he is assured a stable supply of high quality raw product. In years when production is up in the United States a foreign customer will have little trouble obtaining tart cherries but this is not true in years of short supply. Hence, as it has turned out, the foreign market must be partially redeveloped every other year when there is a need on the part of U. S. producers and processors to sell larger quantities of cherries than the domestic market can absorb.

Perhaps the most compelling reason why producers have been willing to consider more complex marketing programs is their realization that as individuals in the market they have absolutely no control over the price which will be received

for their tart cherry crop. Producers frequently express the fear or belief that if they don't take care of their own marketing problems someone else will and in a manner that will be unfavorable to producers.

Another characteristic of the tart cherry industry is the apparent decline in demand for cherry products as a whole. After taking into account the effects of total supply on price over the period 1947-61, prices declined indicating a decline in demand. This tendency was much more pronounced during the period 1947-55. Since 1955, prices have leveled off indicating that the declining demand has been at least partially arrested.[1] Part of this more favorable situation since 1955 has undoubtedly been due to the development and acceptance of a new product, cherry pie filling, and the increased demand for frozen institutional packed tart cherries. Data indicate that cherry pie filling has increased from a raw product equivalent of 13 million pounds in 1955 to a record high 45 million pounds in 1962, Figure 17, p. 80. Nye reports cherry pie filling has been substituted for canned and frozen retail pack in the consumer's menu.[2] In any event, despite a new and successful cherry product, the level of demand in the

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[1]Dennis L. Oldenstadt, Economic Relationships In Red Tart Cherry Marketing, 1947-1962 (Michigan State University, Department of Agricultural Economics Mimeo. 925, June, 1963), p. 4.

[2]Jerrold Nye, The Processor to Consumer Marketing Channels and Flows of Red Tart Cherries and Cherry Products (unpublished Master's thesis, Department of Agricultural Economics, Michigan State University, East Lansing, Michigan, 1963).

industry is not always high enough for price to cover production and harvesting costs and keep tart cherry production competitive with some alternative enterprises.

Besides pie filling and a so far unprofitable attempt to market a jellied cherry sauce, no new cherry products have been forthcoming from the industry. The lack of new products has been a reflection of the difficulties of introducing a new food product plus the fact that few firms have seen fit to commit large amounts of risk capital to the development and promotion of new products. The advent of new dehydration processes has, so far, not offered processors the incentive to market tart cherries in this form. Although the Great Lakes Producers Marketing Cooperative is experimenting with individually quick frozen cherries in a retail pack, it has yet to be fully market tested. Thus the industry has not had a range of new products with which to meet changing consumer tastes and preferences as have some other commodity groups.

The main marketing group efforts have been in the advertising and price bargaining areas. New York and Wisconsin producers collect monies for advertising and promotion under State Marketing orders. Michigan, the largest producing state, operates an advertising and promotion program under a state legislative act which has established the Michigan Cherry Commission to administer collected funds. Pennsylvania and Ohio growers have voluntary programs for collecting promotional funds. Price bargaining has been conducted by the Great Lakes Producers Marketing Cooperative since 1958. Their stated objective is to raise grower price but they also attempt

to arrive at a realistic price based on supply and demand conditions existing in the market. Their bargaining effort is put forth before each harvesting season, and price offers are announced by telegram to processors usually during the third week in June. The bargaining cooperative operates in the five states of Michigan, New York, Pennsylvania, Ohio and Wisconsin. Their membership is composed of about 2400 out of an estimated 6500 growers and is strictly voluntary. Membership is formalized by a grower contract which gives the cooperative exclusive rights to sell members' tart cherries. Members preference processors by written notice to the board of directors of the bargaining cooperative. This preference scheme provides a service to processors for which the cooperative receives a fee. Voluntary assessments are collected by processors and are returned to the cooperative. The cooperative members produce from 40 to 60 percent of the total annual volume of tart cherries.

The producers' cooperative marketing program has evolved from price bargaining into other areas. In 1961, it engaged in a marketing program with the objective of introducing frozen tart cherries into Europe. This program was continued in 1962, a bumper crop year, and to a lesser degree in 1963, a year of extremely short supply.

In 1963 the Great Lakes Producers Marketing Cooperative contracted with a Michigan vegetable freezer to produce individually quick frozen (I.Q.F.) cherries for export. And they have been developing a retail pack to market I.Q.F. cherries domestically. This product is being market tested

in 1964.

The structure of thetart cherry processing industry is relevant to a discussion of alternative marketing programs for the tart cherry industry. The National Canners Guide lists 77 processors in the country who engage in tart cherry canning.[1] There are approximately 30 processors of frozen tart cherries. These 107 processors handle approximately 95 percent of the annual production, the remainder being used in fresh form. There are several established national brands being marketed as well as local or regional brand distribution.

The processors can be categorized into two groups according to their distribution policies. Some market their July and August pack throughout the remainder of the year while some process and sell immediately at harvest time usually packing only those amounts for which they have orders. Those in the former group carry a line of products on a 12-month basis and they are interested in seeing a stable market at harvest time with prices rising throughout the remainder of the year to reflect storage and handling costs. Processors selling at harvest time hope to cover their raw product and processing costs and realize a quick turnover profit. In most years less than one-third of the pack is sold during harvest time or by the end of August.

There is no apparent barrier to entry into the tart

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[1] Canners Directory 1963-64, National Canners Association, Washington, D. C., 1963.

cherry processing business as evidenced by the growth in numbers of processing firms over the past 17 years.[1] A recent trend toward the consolidation of processing firms may, however, make entry of new firms more difficult since they would have to compete against well entrenched, full line processors with established consumer brands for the retail shelf and freezer cabinet space. About one-half of the annual tart cherry crop is frozen in institutional sized 30 pound tins. This form of processing is easy to enter since capital requirements are not large and no brand promotion is necessary in the institutional market.

The location of tart cherry processing plants has in the past been determined largely by the location of production. This was dictated by the perishability of freshly picked tart cherries and the deterioration of quality due to transportation and handling. More recently, however, tart cherries are increasingly being handled and hauled in water making transportation over longer distances feasible. Transportation of finished or processed tart cherries over long distances is not restricted by perishability and quality deterioration. Hence, processed tart cherry products can be moved from one region to another subject only to the economic limitations of increased transportation costs for shipping greater distances.

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[1]Dennis Oldenstadt, "The Tart Cherry Processing Industry: Some Historical and Regional Aspects," 1962 Annual Progress Report (Great Lakes Cherry Producers Marketing Coop, Inc., May, 1962).

Ease of interregional marketing has been largely responsible for the fact that processors generally must contend with the competition or threat of competition from processors in other regions as well as from those nearby. For this reason, they tend to be much more concerned with competition from other processors than with the bargaining efforts of producers. In actual practice a successful bargaining effort by producers can benefit processors. If the bargained price truly reflects supply and demand conditions, the regional stability in price within a given year provided by bargaining lessens the threat of other processors gaining a price advantage in procurement. The competitive threat then arises only from the cost reducing processing and marketing efficiencies of neighboring processors and not from their ability to procure the raw product at a lower price. For these reasons many processors have reacted positively toward the establishment and activity of the price bargaining producers' cooperative. This favorable reaction is perhaps most noticeable among the processors who are in the market on a twelve month basis. Those who pack and sell at pack time are more interested in purchasing tart cherries for the smallest possible price unencumbered by the bargaining effort. Because of their practice of processing only those amounts for which they have orders they naturally have less to fear from neighboring processors.

The processors who market over a twelve month period bear the brunt of post harvest price declines or reap the

fruits of post harvest price advances. There is no typical pattern of prices for processed cherries over the marketing year. Prices developing over the year appear to be heavily dependent upon the movement of tart cherries early in the marketing season (July through September). If the large buyers believe opening prices of the products are higher than warranted, they are prone to buy on a so-called hand-to-mouth basis under the assumption that prices will come down. Their very action of withholding from the market may precipitate a price decline.

Processors holding tart cherry products often cannot recover their storage and handling costs since financing arrangements and product keeping characteristics dictate that most of the products be sold by the end of the marketing season, 12 months after they are packed. This risk is hopefully offset by the financial gains available in those years when large buyers purchase most of their requirements early in the season and prices increase throughout the year as demand exceeds available storage stocks. In either case it is the processing sector which provides most of the storage and risk capital to even out the flow of cherry products throughout the marketing year. Even in years when wholesale and retail buyers commit themselves to heavy early season purchases, a purchase arrangement is usually consummated which makes deliveries "subject to buyers approval of price" (S.A.P.). This permits buyers to shift storage costs to processors providing them with an avenue of escape from their purchase commitments if they choose to exercise their

prerogative.

Fluctuating production and carryover of tart cherries, wide shifts in prices and net incomes, the difficulties of expanding markets, a changing demand structure for tart cherry products and other structural and competitive aspects of the industry discussed above have been associated with depressed prices and incomes to tart cherry producers to the extent that new tart cherry tree plantings have declined in recent years. These are the problems which producers are attempting to offset with marketing programs.

Objectives of This Thesis

The problems outlined above provided the motivation for this study. The general objective is to provide analytical guidelines which can be used by agricultural commodity marketing groups in program and policy formation and evaluation. While this study was developed specifically for the tart cherry industry, the framework of analysis and analytical techniques are generally applicable to other agricultural marketing situations and commodities.

The specific objective is to categorize and study alternative marketing programs for the tart cherry industry employing a demand and supply analysis of the industry. The various marketing programs will be evaluated for their potential effects on prices and net revenue to the industry.

Procedure

A theoretical discussion of potential marketing

programs is presented in Chapter 2. This discussion will categorize marketing programs according to where their influence falls in the supply and demand complex of the market.

Chapter 3 is devoted to a discussion of the demand and supply structure of the tart cherry industry and forms the basis for the analysis of alternative marketing programs which follows.

Programs affecting tart cherry demand are discussed and evaluated in Chapter 4. Market development, new products, the product mix, the geographical location of the frozen institutional tart cherry market and government purchase and diversion are categorized as demand stimulating programs. Data are developed which measures the price and income effects of increasing tart cherry demand.

Chapter 5 provides an analysis of alternative marketing programs affecting the supply of tart cherries. Market information, supply control and supply management or orderly marketing procedures are considered. The effectiveness of these programs is measured by determining the price and income effects of these programs at the producer level. Costs of the alternative programs are considered when relevant data are available.

Programs affecting marketing costs are discussed in Chapter 6. Two programs are considered for their effects on marketing costs: Price bargaining and minimization of transportation costs for marketing frozen institutional tart cherries.

Chapter 7 is a summary of the study.

CHAPTER II

THEORETICAL FRAMEWORK OF ANALYSIS

Economic analysis of alternative marketing programs may be viewed as an attempt to determine the economic impact of the programs as measured by changes in prices and net revenue. One of the most useful methods to employ in evaluating potential marketing programs is the analytical problem approach based on supply and demand analysis.[1]

Estimates of the price elasticity of demand obtained from a statistical demand function can be used to determine the effectiveness of alternative programs in increasing price and revenue to the industry. Several aspects of price elasticity of demand are reviewed in the following section. This discussion is particularly relevant to the analysis of alternative tart cherry marketing programs which follows since the estimated demand relation at the producer level has both an inelastic and an elastic segment within the relevant range over which supply moves from one year to the next. The estimated demand functions at the processing and retail levels, on the other hand, are both elastic over the entire range.

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[1]For a discussion of alternative approaches see: Geoffrey Shepherd, "The Analytical Problem Approach to Marketing," Journal of Marketing, (Vol. 20, October 1955), pp. 173-177.

Elaboration of the Concept of Price Elasticity of Demand

Under very restrictive conditions when the demand curve is a rectangular hyperbola, the price elasticity of demand is constant over the entire range of quantity and price. When this is true, total revenue is constant over the entire range of quantity and price since changes in quantity will be offset by opposite changes in price to the extent that price multiplied by quantity is equal at all points on the demand curve.

The more usual situation is for the price elasticity of demand and total revenue to be different at different points on the demand curve. Figure 1 presents a hypothetical linear demand function from which the price elasticity of demand can be determined at two points B and C. Joan Robinson, following Alfred Marshall's treatment, has shown that the elasticity at the point B on a linear demand function can be found as follows:[1]

$$E_B = \frac{AB}{BD}$$

Similarly the price elasticity of demand at C in Figure 1 is:

$$E_C = \frac{AC}{CD}$$

If the demand curve is not a straight line, the elasticity can be determined at any point by drawing a straight-line tangent to the point, extending it to both axes and computing elasticity as shown above. From the above definition of price

[1]Joan Robinson, The Economics of Imperfect Competition (London: Macmillan Company, Ltd., 1959), pp. 35-36.

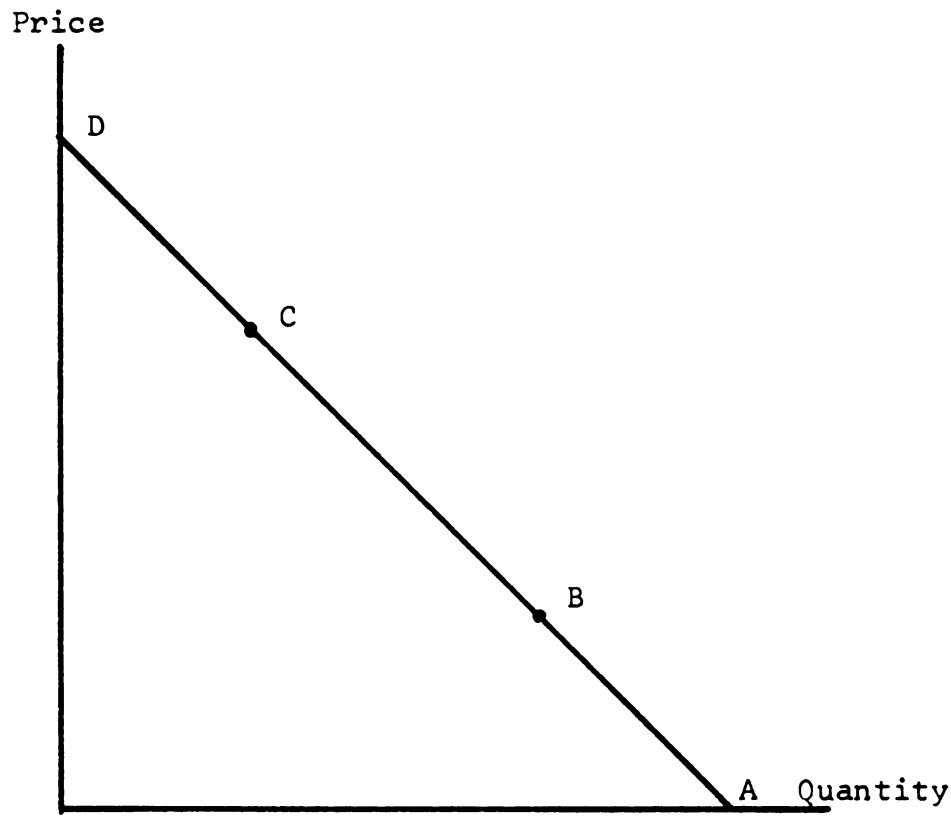

Fig. 1.--A hypothetical demand function

elasticity of demand, it is possible to compute these measures at various points along a specific demand curve.

The price elasticity of demand for a particular commodity can be less than one over one segment of the demand curve and greater than one over another or it can be entirely elastic or inelastic. If a demand function has both an elastic and an inelastic segment there is one point on the demand line where the price elasticity of demand is exactly one. In the inelastic segment of a demand curve a reduction in quantity supplied at a higher price will be associated with a decrease in total revenue. Net revenue at any point is the difference between total revenue and total costs. Thus, to increase total and net revenue, a constant cost industry having both an elastic and an inelastic demand segment would strive to move toward the point of unit price elasticity.[1]

In actual cases the demand curve at the retail level is probably neither a straight-line nor a monotonic increasing or decreasing function. Thomsen and Foote have indicated that demand curves for agricultural products probably turn up at high prices and down at low prices.[2]

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[1] If average revenue declines more rapidly than average total costs as output increases net revenue will increase with movement toward the point of unitary elasticity. Net revenue would be maximized when industry output was at the point where marginal revenue and marginal costs were equal.

[2] Fredrick L. Thomsen and Richard J. Foote, Agricultural Prices (2d ed; New York: McGraw Hill Book Co., Inc., 1952), p. 56.

This would indicate that at very high prices only a small number of buyers would be willing to make purchases. The fact that these buyers do not seek alternative products in this price range means that demand is inelastic in this extreme. Similarly the non-linear demand curve discussed by Thomsen and Foote means that at very low prices buyers would not be willing to purchase very much more of the product even if prices goes very low. Here the market is saturated in that buyers are no longer willing to give up any more substitute products for more of the low priced commodity. In between the two extremes, the price elasticity of demand may be relatively elastic or inelastic depending on the number of substitutes and the proportion of consumer incomes spent on the product. This phenomenon may explain why a bumper crop of some fruits and vegetables cannot be easily moved into consumers' hands even though price is lowered by a considerable amount.

The shape and level of the demand curve is very important when considering appropriate policy to follow in a controlled market. Program costs are also important. For example, a supply restriction program may actually reduce net revenue if it is put into operation when price and quantity are in the elastic portion of a demand curve or if program costs exceed returns.

Another important consideration is the shape of the demand curves at different levels of the market. The demand curve at the retail level is a reflection of the willingness

of ultimate consumers to purchase the product. There are, however, still other demand curves for the commodity that are derived from the ultimate consumer demand. Just as retailers face the consumer demand situation in the market, wholesalers face the retailer demand and processors face the wholesaler demand. Similarly, producers face the demand created by processors seeking to process those quantities which will enable to fill orders from wholesalers. The demand schedules below the consumer demand level are called derived demand schedules, because they are derived from the ultimate consumers' willingness to buy a product.

In the long run, it is expected that the difference between demand curves or schedules at any two levels will equal the per unit cost of the services provided by that segment. That is, the difference between the consumer demand and retailer demand curves should equal the per unit cost of the retailing function. The important consideration to be explored is the shape and price elasticities of the various demand and derived demand curves. The question to be raised in this context is, will a marketing program which affects the supply or demand curves be acceptable to all the market participants or is it possible that one group would benefit from such programs while another group would suffer?

Let us assume that a linear demand function prevails at the consumer level, that per unit costs of wholesaling and retailing are constant over the full range of output and that the retail margin is a constant absolute amount. The consumer demand and the retailer derived demand curves are shown in Figure 2.

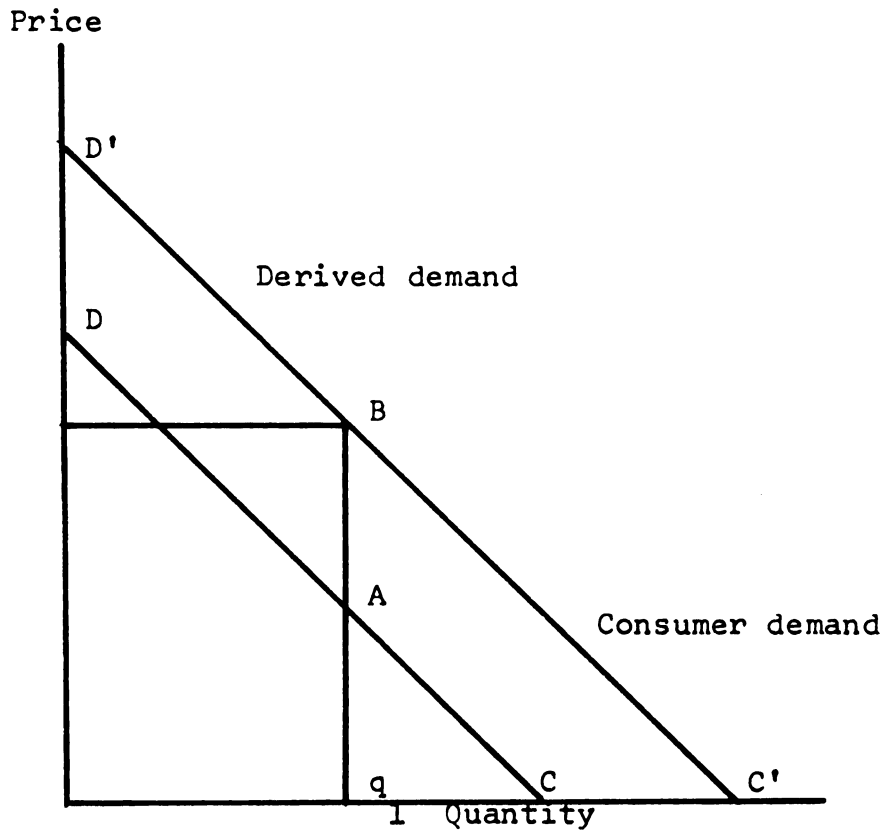

Fig. 2.--Hypothetical consumer demand and derived demand under a constant absolute marketing margin.

Assuming that the supply function is perfectly inelastic at q_1, the price elasticity of demand on the retailer derived demand curve at point A is less than that at point B on the consumer demand curve. This can be proven by the use of the line segment formulas discussed above since[1]

$$\frac{AC}{AD} < \frac{BC'}{BD'}$$

Under the assumed conditions, a program which affects the quantity demanded such as a supply control program could have a different impact on net revenue at the retail and wholesaler levels. In fact, it is possible that a supply restricting program could reduce net revenue to retailers and increase net revenue to wholesalers providing the change in supply occurred in the elastic portion of the consumer demand curve and the inelastic portion of the retailer demand curve faced by the wholesalers. A similar set of circumstances could occur at the wholesale derived demand level faced by processors and the processor derived demand level faced by producers.

Thus, the shapes and positions of the demand curves and the program costs are very important when discussing alternative marketing programs. The above discussion indicates that it cannot be assumed that all market participants i.e. retailers, processors and producers stand to benefit

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[1]Another proof is as follows: Since Elasticity = $\frac{\partial Q}{\partial P}\frac{P}{Q}$, and $\frac{\partial Q}{\partial e}$ is equal at A and B, $E_A < E_B$ since $\frac{P_A}{Q_A} < \frac{P_B}{Q_B}$.

equally from marketing programs such as will be discussed in the following sections.

Given the theoretical constructs of supply and demand it is possible to classify marketing program alternatives into five types according to where their influence will fall in the supply and demand structure of the market. This classification scheme may be applied to any agricultural commodity marketing program.

Programs That Affect Consumer Demand

Three types of marketing programs are available which affect consumer demand. They are market development and merchandising programs, product development programs including new products and new uses of old products and programs which affect governmental purchases and diversion of the commodity in question. These programs attempt to move the consumer demand curve to the right by stimulating ultimate consumers to purchase more of the product or to make demand more inelastic with respect to price. One of the factors affecting the demand function is consumers' tastes and preferences or their states of mind about the product. It is this factor that promotion agencies attempt to change through promotion programs.

Market development programs.--These programs include advertising, merchandising assistance, pricing, package design and public relations. There are two general methods of stimulating consumer demands through advertising. In the parlance of the trade an advertising program may attempt to

"pull" a product through the market by appealing directly to final consumers or it may attempt to "push" a product through the market by appealing to retailers or secondary manufacturers such as bakers, preserve manufacturers and others who can be encouraged to get behind the sales of a product.

While the effectiveness of an advertising program is difficult to measure, the consensus of opinion in most industries appears to be that advertising does increase sales and net revenue enough to make this activity profitable. Other types of market development activities are often overlooked but can have an important influence on demand.

Product development programs.--A new product may be developed which is acceptable to more consumers than the existing available products, or present consumers may increase their rate of purchasing thereby increasing the market demand for the commodity. Large expenditures are made by manufacturers and food processors on new product development. While the failure rate of new products is particularly great, the financial returns from an acceptable new product are frequently sufficient to command the necessary risk capital. Advertising and other promotional programs such as in store demonstrations and coupons are generally used in conjunction with the introduction of new products.

Government purchase and diversion programs.--Governmental agencies are large purchasers of some agricultural commodities. The demand creating nature of programs such as school lunch purchases, welfare programs, the food stamp program, military purchases and export programs such as

P.L. 480 can be very important to a commodity group. The fact that these programs place commodities in the hands of consumers who might not otherwise consume them is responsible for the increased demand in the short run. Long-run demand may be increased because of the consumption habits formed by the recipients. If such programs are effective demand shifters, they must increase total sales of the commodity and not replace purchases which would naturally occur.

Programs That Affect the Supply

There are at least five types of programs available to a commodity group which affect the supply side of the market. One objective of these programs is to move the supply curve to the left where the equilibrium price is higher than under no program. Another objective is to even out the seasonal nature of production. Given an inelastic demand in the relevant range of supply control, the expected total revenue will be increased and if average costs (including the supply control costs) are constant, net revenue will be increased.

Programs affecting supply include providing information on crop and price prospects, contractual arrangements between producers and processors, marketing quotas, health and sanitary restrictions on output, grade and size programs, and a broad group of programs aimed at orderly marketing.

Informational programs.--Price and crop prospects or outlook information are included in this category. Advanced information of this type to producers of an agricultural

commodity can often avert potential market gluts and depressed prices providing producers alter production plans or shift resources into alternative enterprises. The U. S. Department of Agriculture annually publishes recommendations on increases or decreases in vegetable acreage which will match expected changes in demand resulting in more favorable prices and incomes.[1] Similar recommendations are made by some private organizations which operate in a market. These recommendations are most often made to producers of annual crops or to producers of animal products including milk.

Coordination arrangements affecting supply.--Most vegetable processors obtain their raw food products under contractual arrangements with growers. This procedure usually is aimed at specifying the number of acres to be produced, the maturity of the crop at harvest and other factors influencing output. These arrangements often benefit individual processors in that they lead to more uniform quality. In addition, the total quantity of produce available to a processor is more predictable and a market glut can be avoided. Harvest and delivery dates can be specified permitting the processor to utilize his plant and labor more efficiently.

Vertical integration is also a form of coordination between producer and processor which has gained considerable acceptance in recent years. The producer may provide only the land and labor, the seed, fertilizer, management and

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[1] U. S. Department of Agriculture, Acreage Marketing Guides. AMG. 33, August 1963.

financing being provided by the processor or, in the case of poultry and meat production, the feed, fowl or livestock, management and financing being provided by the feed distributor.

Marketing quotas.--A marketing quota program has been used by some commodity organizations, particularly by milk producers, to control the volume of produce entering marketing channels. Part of the effect of marketing quotas is to limit entry of potential producers and to restrict expansion by existing producers. This method of supply control requires a strong producers organization working in close cooperation with processors or distributors or an integrated grower organization which owns processing and/or distributing facilities. The Welsh grape cooperative program which specifies acreages is an example of the use of marketing quotas as is the California Cling peach association program, although the marketing quota program of the latter group has been implemented by the use of a marketing order which provides for the destruction of that part of the crop deemed to be in surplus supply.

Health and sanitary regulations.--A more indirect method of limiting output by restrictions on the use of inputs occurs through various health and sanitary regulations. These programs are most applicable to the production of commodities such as milk but they can be applied to other commodities subject to infestation by maggots and insects. When health and sanitary restrictions are in force, potential producers who are not certain that they can meet the requirements are discouraged from committing the necessary resources

to the production of the regulated commodities.

Grade and size regulating programs.--Programs which specify marketable grades and standards for a commodity can also be classified as supply control programs. Lower grade products placed on the market often are purchased by consumers instead of the better products thereby replacing some sales of the better quality product. This may, in the short run, mean added total sales but can conceivably lead to lower total sales in the future. For if the buyers of the poor quality commodity find it to be undesirable relative to alternative substitutes, their purchasing habits may change. This may have a long run impact in that it lowers sales of even the better quality commodity that is placed on the market in the future. Conversely, a program which maintains high standards for quality can have the effect of gaining consumer confidence in the product. The importance of high grade and quality has prompted many processors to adopt their own high quality control programs. All too often, similar programs are overlooked by producers partly because of the difficulty of organizing any concerted effort in this direction.

Programs designed to promote orderly marketing.--Regulation of commodity flow onto the market in the time and place dimensions may be viewed as orderly marketing techniques. By regulating the flow of a commodity onto the market over a sufficient period of time, price depressing market gluts can sometimes be avoided. When a commodity group faces an inelastic demand with respect to price in the relevant range of production, a sudden rush of commodity sales, such as that

which occurs at harvest time for perishable fruits and vegetables, can mean a proportionately greater decline in per unit price. This, in turn, is associated with declines in total and net revenues.

Commodity pools have been established by some producer groups. This technique gives control to a central selling agency which can regulate sales from the pool in the time dimension as well as bargain with buyers for a higher price. Such a program is generally most adaptable in a storable commodity providing storage and financing facilities are readily available. In the case of a perishable commodity, producers may have to have the commodity processed into a preservable form in order to conduct a pooling and marketing program. For less perishable commodities harvest and/or shipping dates can be synchronized to avoid extreme price depressing market gluts.

There are several other specific measures which can be taken to attain orderly marketing. Federal marketing orders for some commodities provide for pooling and surplus diversion. Information on expected future price movements is an aid to orderly marketing.

The regulation of commodity flows between markets or in the space dimension is the second method of promoting orderly marketing. In general, a market diversion program seeks to divert part of the marketable supply of a commodity out of one market and into another market in such a way that net revenue is increased. The diversion must occur from a market with a relatively inelastic demand with respect to price to a market with a relatively elastic (or less elastic) demand with respect

to price. Conceptually this activity would be continued until marginal revenues in both markets areequal to each other, and to marginal cost of providing the unit of commodity which is assumed to be the same in both markets. For example, a market diversion program for grapes would exist if part of the crop were diverted from the relatively inelastic wine market to the more elastic raisin market. Two requisite conditions are that the price elasticities of demand must be unequal and that the markets must be separate.

The short run effectiveness of a supply control program of the type discussed above depends on several factors which are related to the supply and demand conditions of the particular industry. As shown in the preceding chapter, a demand curve may have varying point elasticities depending upon the shape of the demand curve and its position. If the objective of a control program is to increase net revenue, demand in the area of control must be inelastic with respect to price and the program cost must be less than the total return. For if demand is elastic, a movement of the supply relation to the left through a control program is associated with a larger per unit price but smaller total and net revenues.

The fact that a successful supply control program results in price and revenue enhancement can have a secondary effect on the market. An increased price may mean an increase in imports since the market will be more lucrative to the exporting country. In addition, the increased price for the controlled commodity may cause consumers to shift their demand to a substitute product, thereby having a secondary effect on

the demand for the controlled commodity.

The long run effectiveness of a supply control program can be greatly diminished by the entry of new producers and the expansion of output by established producers. No effective method has been devised to guard against this eventuality. Thus a successful supply control program may actually increase the need for more restrictive control measures and additional expenditures for market development, advertising and promotion.

Programs That Affect Production Costs

The supply control alternatives discussed above are those which influence the output of a commodity assuming that the production function is given and immutable. Relaxation of this assumption leads to a consideration of programs which affect the supply curve by changing the input-output relationships in the production of a commodity sometimes referred to as a change in the "state of the art" of production.

Programs which increase production efficiency lead to increased unit profits to those firms undertaking such programs. Although competitors may eventually adopt the more efficient methods driving down the innovators profits there is usually sufficient economic incentive to promote the adoption of innovations and cost reducing techniques. To an individual firm, such an innovation means reduced costs per unit, a possible increase in output and expanded net revenue. If it is impossible to expand output because of the nature of production or an institutional barrier, reduced per unit cost is associated with increased net revenue.

Program alternatives for reducing unit costs include informing producers of new techniques of production and harvesting and educating them to better integrate and coordinate their business affairs. Research programs by public and private research agencies can be encouraged through favorable public relations and financial backing. A third method of reducing production costs is for producers to collectively or cooperatively purchase inputs including services and information.

Collection of the required information in a decision-making process can be an expensive and time consuming job for individual producers. These firms can often realize economies by pooling their resources to gather study, evaluate and disseminate relevant information. This can be accomplished through either a private or public agency. These programs are supply affecting programs since changes in production costs affect the supply side of the market.

Programs That Affect Marketing Costs

The demand stimulating programs discussed in the beginning of this section were concerned mainly with affecting demand at the retail or ultimate consumer level. Market development and new product innovations were reviewed. It was also shown in the beginning of this chapter that the derived demand curves at each level of the market are related to the ultimate consumer demand and in the long run, at least, differ only by the marketing margin which in a competitive economy equals the costs of providing the marketing services plus a normal profit.

Producers of agricultural commodities are interested in programs which reduce marketing costs since some of the savings may revert to producers in the form of higher prices. Programs designed to reduce marketing costs emphasize marketing research on the legal, economic, institutional and practical or technological arrangements leading to smaller margins. These programs are related to those which attempt to reduce production costs. For a program which affects marketing costs at the processor level is a production cost reducing program to the processor.

Direct Payments or Income Subsidization

The fifth alternative for affecting price and revenue is the direct payment or income subsidy program. This approach is designed to provide a per unit price over and above that which obtains at the intersection of the supply and demand curves. Producers and processors (during the price freezing days of World War II and the O.P.S. and in the case of the current wool subsidy) have received governmental income payments or direct subsidies.

In essence, prices are established by the forces of supply and demand, the difference between market price and the legislated or administered price being paid directly to producers or processors.

Industry Objectives

It is difficult to adequately evaluate alternative action programs unless some information is available on the objectives and values held by the industry. The broad

objectives assumed to be held by the majority of the tart cherry producers is to realize increased net economic returns from the production and marketing of their future tart cherry crops. They obviously hold certain beliefs and values which temper this objective. For example, producers would not wish to sacrifice their freedom to decide their own production and marketing policies. Producer members of the Great Lakes Producers Marketing Cooperative have the additional objective of stabilizing price between producing areas in a given year.

Processor objectives parallel those of producers with regard to freedom to process and market tart cherries. While the net returns per unit are important to a processor, he realizes that profits in excess of those necessary to keep the resources employed in the long run will not be possible because of competition. In most cases a processor is willing to settle for a constant relative share of the market consistent with his plant capacity and ability to obtain the raw product.

CHAPTER III

TART CHERRY DEMAND AND SUPPLY

Figure 3 shows the expected relationships between demand, supply and price for tart cherries in a theoretical model. The arrows show the direction of influence between variables. Supply variables are grouped on the left and demand variables on the right of Figure 3.

Factors Affecting Tart Cherry Demand

The demand for tart cherries at retail is a function of per capita disposable income, population, prices of substitutes for tart cherry products and other demand factors including tastes and preferences. The demand for tart cherries at retail cannot be directly determined statistically because adequate retail price data over time are not available. The retail demand, however, can be determined under the assumption that prices at wholesale differ from those at retail by the cost of marketing. And the demand at wholesale can be estimated statistically since data on f.o.b. processing prices (wholesale prices) are available.

Several demand relationships have been estimated at the wholesale level by members of the Department of Agricultural

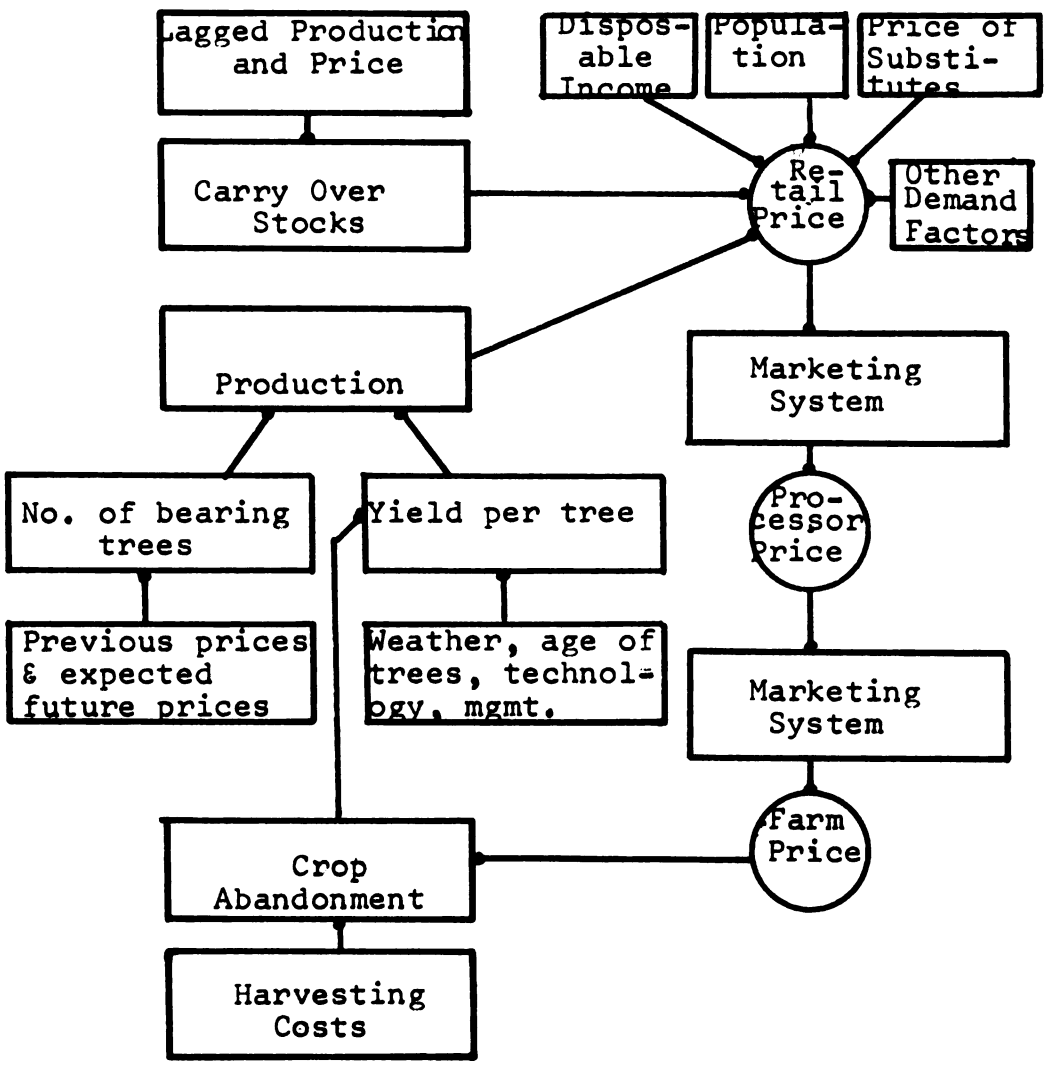

Fig. 3.--Supply and demand structure for tart cherries.

Economics at Michigan State University.[1]

The demand relationship at the processor level has been estimated for the combined three tart cherry products (number 10 and number 303 canned tart cherries and frozen 30 pound tins of tart cherries) which account for the bulk of the annual tart cherry pack.[2] Since 1955, tart cherry pie filling has grown in importance. In 1962, 45 million pounds of pie filling were packed out of a total crop of 318 million pounds. This product was not included in the demand relationship, however, since no monthly price data are available. The demand relationship at the processor level is shown in Figure 4.

This relationship was estimated by fitting the season quantity weighted average f.o.b. processor prices of the three major tart cherry products to per capita total supply data for the period 1947 through 1962 using the ordinary least squares regression technique.

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[1] Ben C. French and R. A. Shaw, Economic Relationships in Red Cherry Marketing, 1947-1957, (A Progress Report), (Michigan State University, Department of Agricultural Economics Mimeo No. 726, June 1958); William A. Cromarty and R. A. Shaw, Economic Relationships in Red Cherry Marketing 1947-1958 (A Progress Report) (Michigan State University Department of Agricultural Economics Mimeo No. 763, June 1959); Carleton C. Dennis, Economic Relationships in Red Cherry Marketing, 1947-1959 (A Progress Report) (Michigan State University, Department of Agricultural Economics Mimeo No. 790, June 1960); Dennis L. Oldenstadt, Economic Relationships in Red Tart Cherry Marketing, 1947-1962 (Michigan State University, Department of Agricultural Economics, Mimeo 925, June 1963).

[2] All demand functions shown are for these three products.

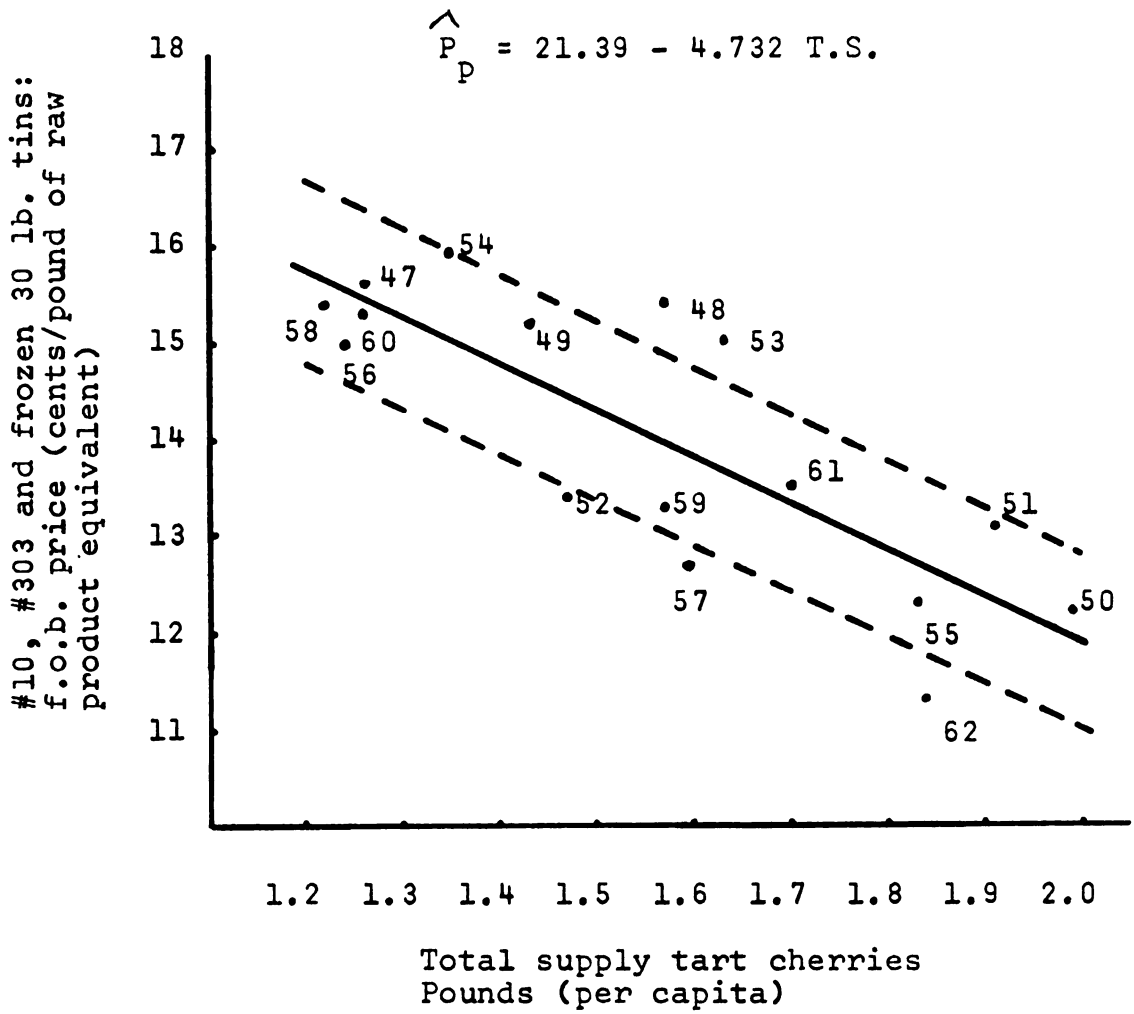

Fig. 4.--Tart Cherries: Estimated Demand at the processor level, 1947-1963 data for the United States.

Observation of the points in Figure 4 confirms the assumption of a linear relationship between variables. The deviations of the actual price-total supply points from the estimated relationship shown by the solid line in Figure 4 occurred for a variety of reasons. In 1947, the price restrictions imposed during World War II were listed influencing the positive residuals in 1947 and 1948. In 1962 processors purchased a record large crop of cherries from growers for 5 cents per pound which was reflected in the low price and negative residual in that year.

The above demand curve relates season weighted average f.o.b. processing plant prices to per capita annual total supply which is the sum of pack and carryin stocks. This demand relationship can be thought of as the short run or annual derived demand for tart cherries at the wholesale level.

The derived demand for tart cherries at the producer level can be determined from the above relation by adjusting wholesale prices downward by the marketing margin. A constant absolute marketing margin of 6 cents per pound exists between the producer and processor levels as shown by data in Figure 5. The relationship between grower price and per capita total supply is shown by the following equation which was obtained by adjusting the processor relation shown in Figure 4 by the producer-processor margin of 6 cents.

$$\hat{P}_f = (21.39 - 6.00) - 4.732 \text{ T.S.},$$

$$\text{or } \hat{P}_f = 15.39 - 4.732 \text{ T.S.}$$

Graphically the relationship between grower prices and total supply is shown as the solid line in Figure 6.

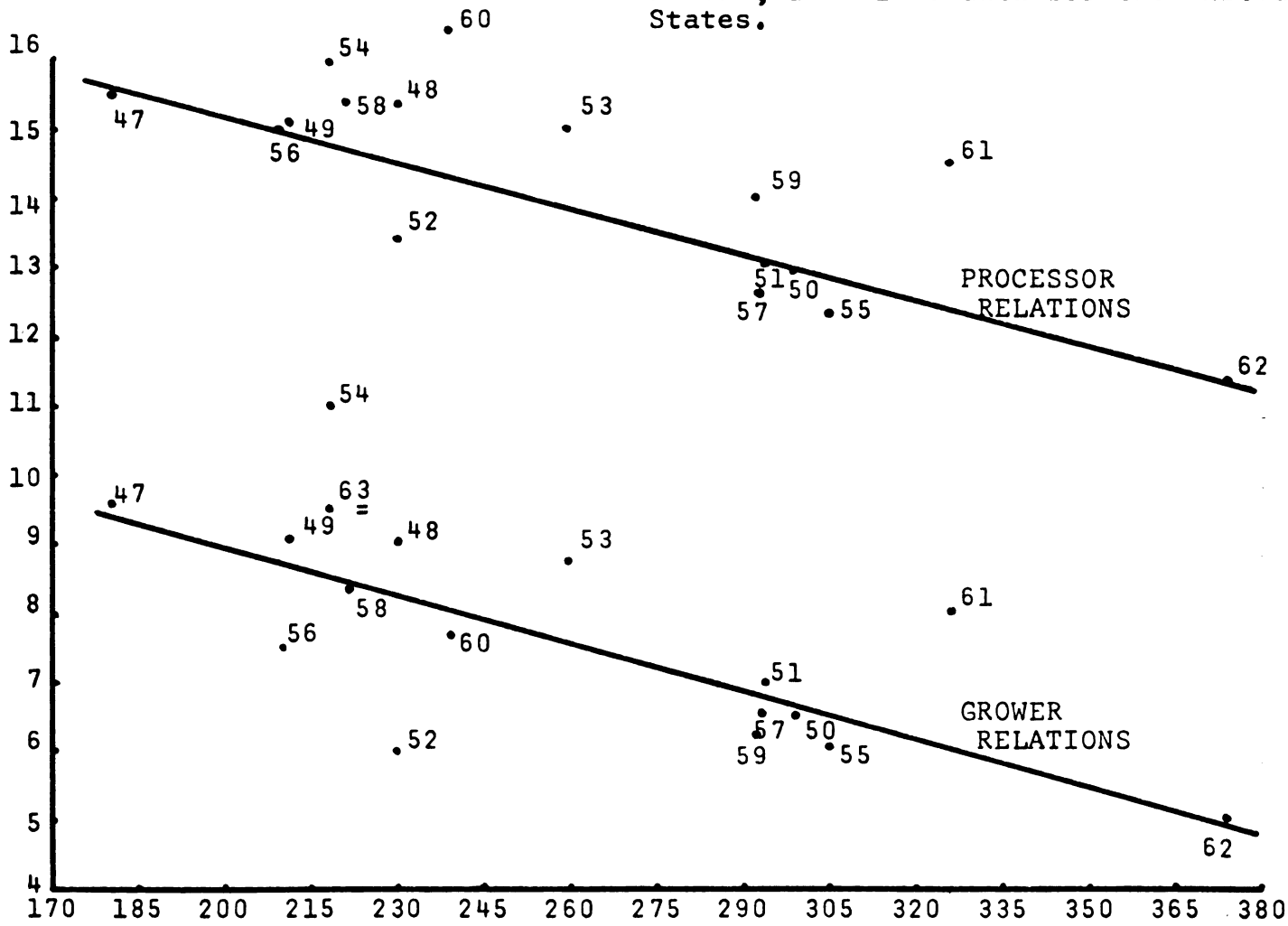

Fig. 5.--Tart cherry prices and total annual supply, grower and processor levels, 1947-1963 data for the United States.

Source: Computed from data in D. L. Oldenstadt, Economic Relationships in Red Tart Cherry Marketing, 1947-1962 (MSU, Ag. Econ. Mimeo 925, June 1963).

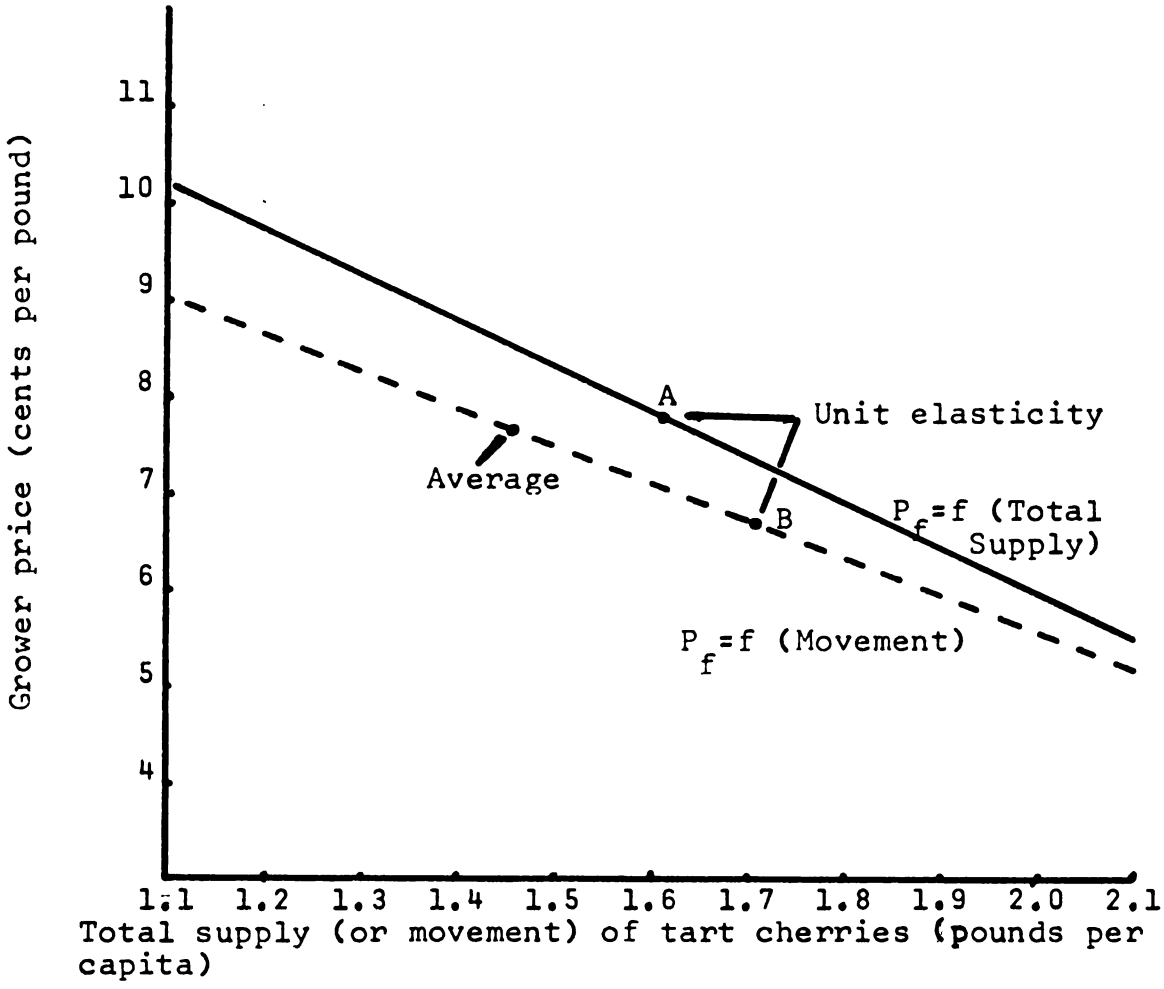

Fig. 6.--Tart cherries: Estimated demand at the producers' level, 1947-63 data for the United States.

For purposes of comparison, the demand relationship estimated by Dennis is represented in Figure 6 as the broken line.[1] His analysis used per capita movement rather than per capita total supply as the quantity variable, which is smaller than total supply by the amount of inventory carried at the end of season. The points of unitary elasticity on both demand relationships are shown and will be referred to in more detail later in this study.

The demand at retail can be estimated from the demand relation obtained at the processor level by applying appropriate processor-retailer margin relationships. Since adequate data are not available on retail prices, two assumptions are made about the nature of the processor-retailer margins and their results are compared.

The first assumption is that the processor-retailer margin is a constant 15 cents per pound. This links processor and retail prices together by the formula:[2]

$$P_r = 15 + P_p$$

where P_r = retail price in cents per pound

P_p = processor price in cents per pound.

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[1] C. C. Dennis, Long-Run Equilibrium in Tart Cherry Production (Michigan Agricultural Experiment Station Bulletin No. 29, 1963), p. 14.

[2] For an excellent discussion of marketing margins see: Sidney Hoos, Prices and Marketing Margins for Fruits and Vegetables: 2 Weekly Prices and Retail Margins - Small, Medium and Large Stores, Oranges, Lemons, and Grapefruit, Denver, August 1948-July 1949. (California Agricultural Experiment Station, Giannini Foundation of Agricultural Economics, Mimeo No. 170, Sept. 1954), pp. 123-141.

The retail demand function obtained under this assumption is:

$$\hat{P}_r = (21.39 + 15) - 4.732 \text{ T.S.}$$

$$\text{or } \hat{P}_r = 36.39 - 4.732 \text{ T.S.}$$

where $\hat{P}_r$ is the estimated price of tart cherries at retail and T.S. is the annual per capita total supply of tart cherries.

The retail demand relation under the constant absolute margin assumption of 15 cents is shown by the solid line in Figure 7.

The second assumption is that the processor-retailer margin is a constant percentage margin of 50 percent of retail price. The relationship between prices at the processor and retail levels is given by the following formula:[1]

$$P_r = \frac{P_p}{1-K},$$

where P_r and P_p are the same as above

and K = the percentage margin as a percent of retail price.

The demand function obtained under the assumption of a constant percentage margin of .5 is:

$$\hat{P}_r = \frac{21.39 - 4.732 \text{ T.S.}}{.5}$$

$$= 42.8 - 9.464 \text{ T.S.},$$

where all variables are as defined above.

The retail demand relation under the constant percentage margin is shown by the dotted line in Figure 7.

The margin assumptions (a constant absolute amount and a constant 50 percent of retail price) were made partly

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[1] Ibid., p. 129.

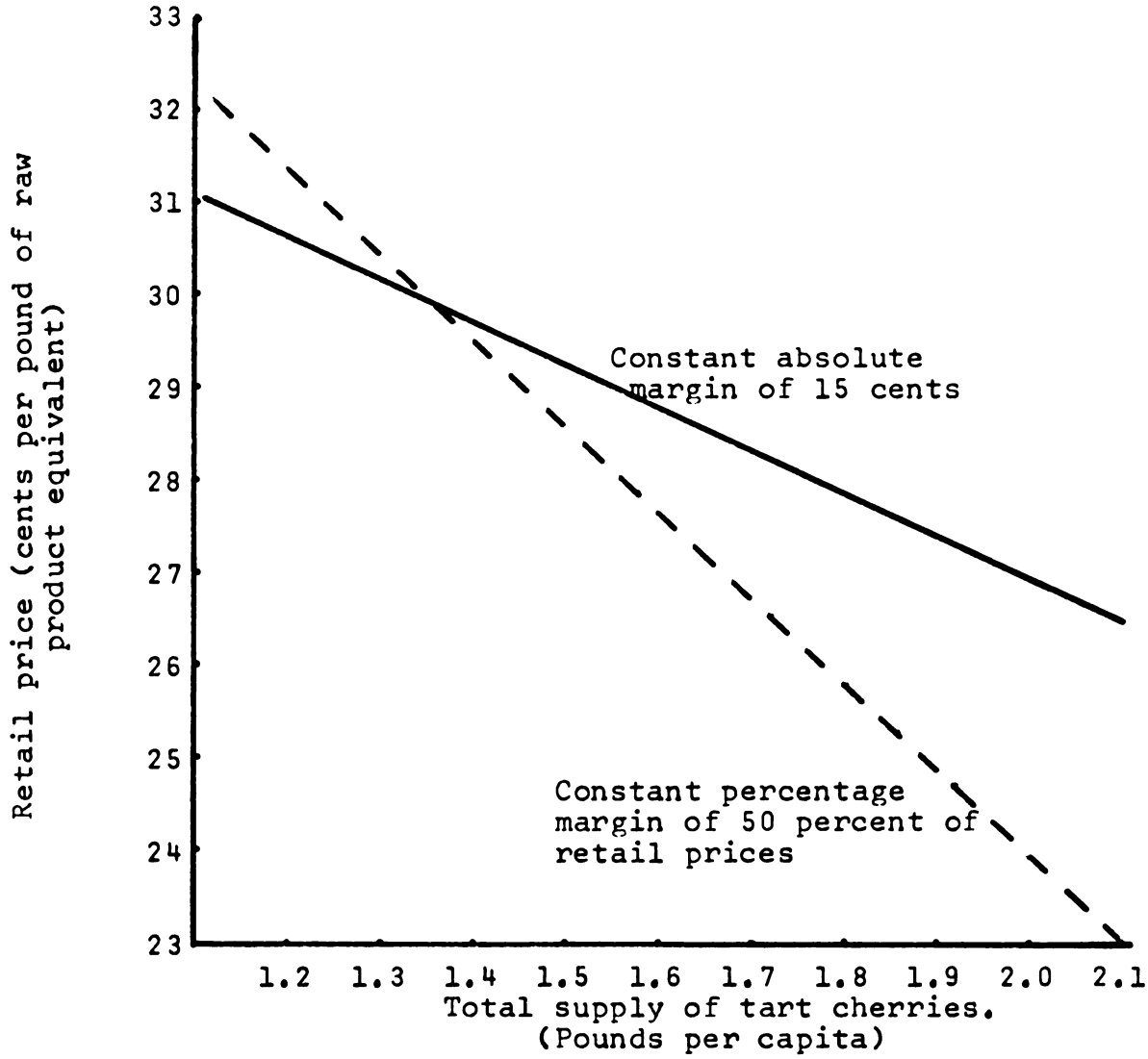

Fig. 7.--Tart cherries: Estimated demand at the retail level, under constant absolute and constant percentage margin assumptions, 1947-63 data for the United States.

on the basis of the following data showing retail prices of tart cherries for three cities, by quarters over the period 1957-1961.

Weighted average processor price of No. 10 and 303 canned and 30 pound frozen for the period 1957-61 was about 14 cents. Average retail prices for the same period for October were: Detroit 24.6, Pittsburgh 26.2 and Portland 26.6 for an overall average of about 26 cents. This indicates an overall margin for canned No. 303 tart cherries of 12 cents per pound equivalent since one can of No. 303 water packed tart cherries contains about one pound of tart cherry raw product equivalent.[1] Other products such as tart cherry pies, and tart cherry pie filling sell for even higher prices raising the average margin to at least 15 cents. Thus given the data on retail and processor prices, a 15 cent absolute margin and a 50 percent relative margin appear realistic.

The above demand estimates will be used throughout Chapter 4. Program alternatives will be formulated and their influence on demand will be estimated. The differences between price, quantity and total revenue will then be computed to give an indication of the economic feasibility or to indicate potential changes in price and total returns (or net returns when cost data are available) of the alternative marketing program.

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[1] Conversion Factors and Weights and Measures for Agricultural Commodities and Their Products (Production and Marketing Administration, U. S. Department of Agriculture, May 1952), p. 61.

TABLE 1.--Retail prices of No. 303 canned water packed tart cherries, Detroit, Pittsburgh and Portland, quarterly, 1957-1961

City	January	April	July	October
1957:				
Detroit	1/	24.9	24.5	23.8
Pittsburgh	1/	2/	25.8	23.9
Portland	1/	2/	2/	24.6
1958:				
Detroit	25.1	24.3	24.6	25.9
Pittsburgh	23.0	28.4	26.9	25.7
Portland	25.9	25.7	25.2	26.5
1959:				
Detroit	25.9	26.2	26.5	24.5
Pittsburgh	29.5	27.6	27.9	28.3
Portland	27.7	28.2	28.3	27.4
1960:				
Detroit	24.4	23.6	22.8	24.4
Pittsburgh	25.0	25.8	25.3	26.8
Portland	27.2	26.4	26.6	27.7
1961:				
Detroit	25.5	26.1		
Pittsburgh	27.9	24.5		
Portland	29.2	28.8		

1/ BLS prices revised in February 1957
2/ Insufficient number of quotations

Source: Bureau of Labor Statistics data collected by Loyd Martin, Leader Horticultural Crops Section, Economic Research Service, U. S. Department of Agriculture.

Factors Affecting Tart Cherry Supply

The supply of tart cherries is determined by two main factors: bearing tree numbers and yield per tree. The number of bearing trees depends largely on prices for tart cherries that existed 6-25 years previously when new trees were set out and, to a lesser extent, on producers expectations about future tart cherry prices at that time. Costs and returns from production of tart cherries relative to other crop or livestock alternatives also have a bearing on decisions to plant cherry trees.

The yield per tree depends primarily on weather conditions during the spring months when trees are in the bud and bloom stages. But other factors such as the age of tree, cultural and management practices in the orchards and available technology also play a role in affecting yields. These forces affecting available supplies of tart cherries were diagrammed in Figure 3.

Bearing tree numbers.--Tart cherry trees come into production 6 to 8 years after being planted and continue to bear fruit about 25 years. The Bureau of the Census tabulates numbers of bearing and nonbearing tart cherry trees in census years.[1] Data are available for census years 1940, 1950, 1954 and 1959 and are tabulated for 11 principal producing states. Figure 8 traces bearing tree numbers for the 5 Great Lakes producing states and the 6 Western producing states of

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[1]Reported by U. S. Department of Agriculture, Agricultural Marketing Service, Fruit and Vegetable Division, Unpublished Work Sheets, 1964.

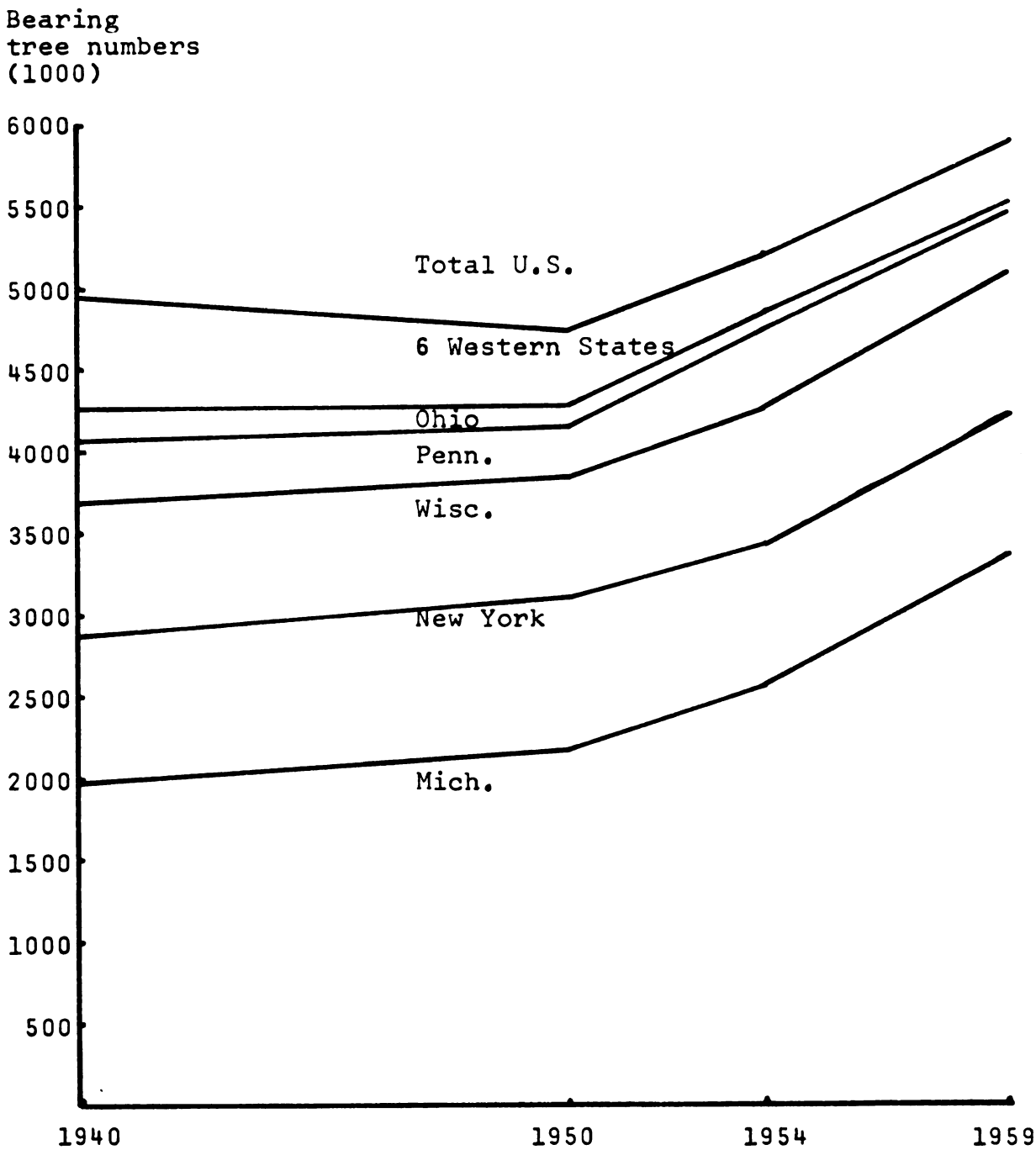

Fig. 8.--Bearing tart cherry tree numbers, Great Lakes producing states and six Western producing states, interpolated between census year data for 1940, 1950, 1954 and 1959.

Washington, Oregon, Colorado, Utah, Idaho and Montana.

Wisconsin growers have increased bearing tree numbers only slightly. New York and Pennsylvania bearing tree numbers have remained about the same over the 20 year period while Ohio and the six Western states combined have experienced declining bearing tree numbers.

Only Michigan has shown a definite upward trend in bearing tree numbers over the period spanned by census data. Bearing tree numbers in Michigan climbed from less than 2 million in 1940 to slightly more than 3.3 million in 1959, a 65 percent increase. Michigan accounted for two-fifths of the total in 1940 but climbed to three-fifths of the total by 1959.

The nonbearing tart cherry tree numbers are also tabulated by the Bureau of the Census. These figures reflect normal replacement of old trees and give an indication of increases and decreases in tart cherry tree numbers by states.

Figure 9 shows a state breakdown of nonbearing tart cherry tree numbers for census years.

The most interesting feature of Figure 9 is that nonbearing tree numbers fell off drastically in 1959 indicating a decline in new plantings. Prices of tart cherries since 1959 probably have not been favorable enough to alter the downward trend in nonbearing tree numbers.

At least one-twenty-fifth of the bearing trees must be replaced each year in order to maintain tree numbers over the long run. Since there are approximately 6 million bearing

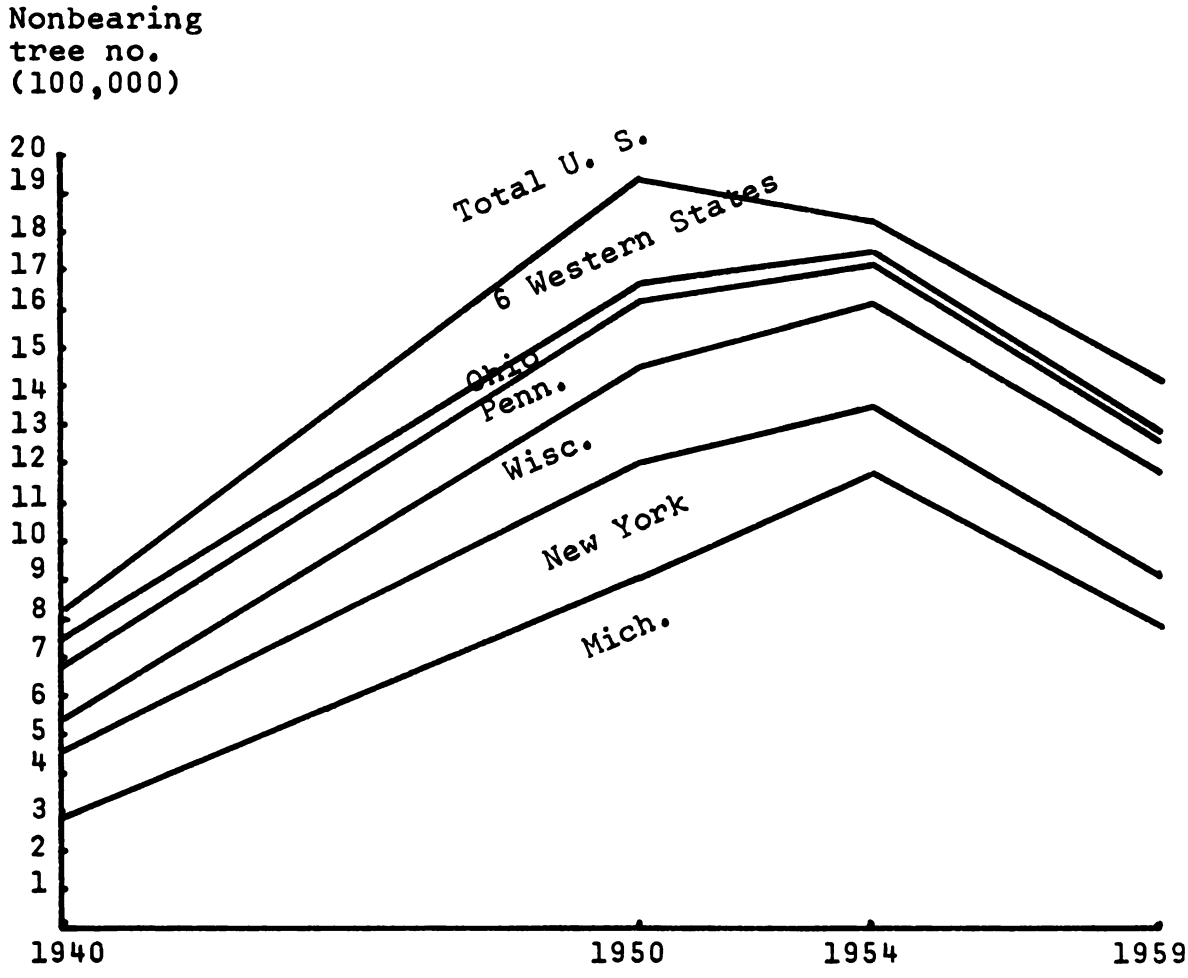

Fig. 9.--Nonbearing tart cherry tree numbers, Great Lakes producing states and six Western producing states interpolated between census year data for 1940, 1950, 1954 and 1959.

trees, at least 240,000 new trees must be planted each year just for maintenance purposes. In actual practice an even greater number of trees may be required for maintenance since considerable numbers are lost because of disease, insects, pests and winter damage.

In addition to orchard maintenance, population increases mean that larger quantities of tart cherries are required annually assuming per capita demand of about 1.4 pounds is maintained. An annual population increase of about 3 million people and an average production per tree of 42 pounds means that about 100,000 extra trees are required each year just to keep up with population growth.

Still another factor has a bearing on needed tree numbers. Figure 10 shows the trend in production per tree has declined from a peak in 1953 of 50 pounds per bearing tree to about 40 pounds per tree in 1963. If yield per tree continues to decline, still more trees will have to be brought into production in order to maintain supplies at the current level.

Declining numbers of nonbearing trees, lower yield per bearing tree, the limited life of the trees and population pressure may eventually lead to shortages and higher prices.

Yield per tree.--The yield of tart cherries per bearing tree is the second factor along with the number of trees which influences production or supply of fruit in a given year.

Figure 10 also traces the movement of yield per tree

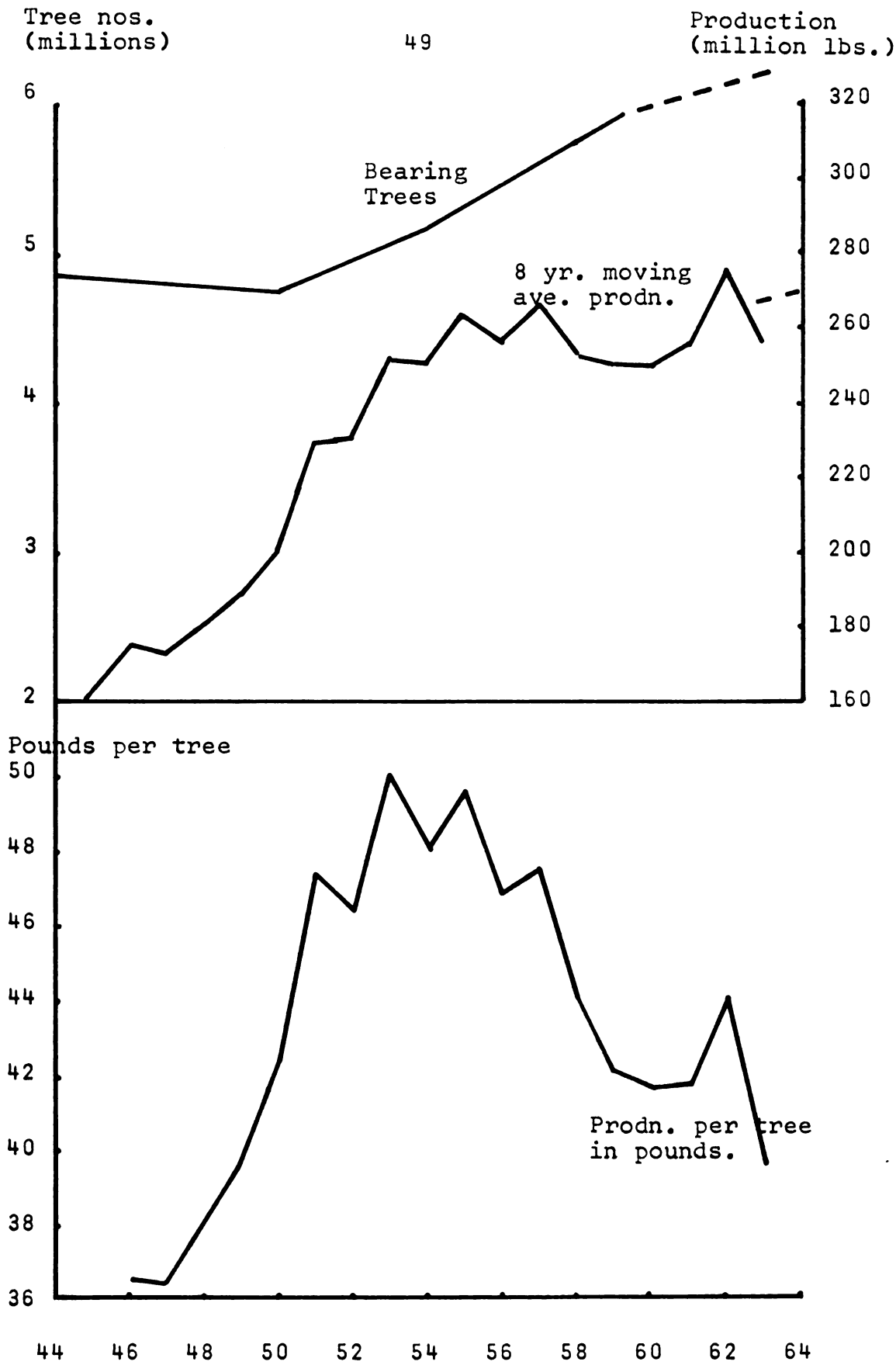

Fig. 10.--Tart cherries: Bearing tree numbers, 8-year moving average production and production per tree, 1940-1963 for the United States.

over the period 1946-1963. These annual estimates were obtained as follows: Bearing tart cherry tree numbers were obtained for the census years as in Figure 8 and interpolated between census years to obtain annual estimates of tree numbers. Then an eight-year moving average of total U. S. production of tart cherries was computed for each year. This average total production figure was divided by estimates of bearing tree numbers to obtain annual estimates of yield per tree.

The most notable feature of these yield estimates is that they have not trended upward over the past several years as might have been expected with the advent of improved spray materials, fertilization and cultural practices. The effect of these technological innovations apparently reached its peak in the 1953 to 1955 period. Since that time the data show a fairly continuous downward trend in yield per tree. Whether this phenomenon is caused from the cyclical nature of weather and production, from a growth in tart cherry diseases despite improved chemicals or from an increase in age of bearing trees has not been investigated.

CHAPTER IV

MARKETING PROGRAMS DESIGNED TO INFLUENCE TART CHERRY DEMAND

Market Development Programs

A market development program includes finding new uses for old products and locating and opening markets both domestic and foreign where tart cherries are not currently available.[1]

Promotion may be aimed at creating or forming a favorable image of a new product through informing consumers of the advantages (real or imagined) of the product. For established products, promotion may be aimed at improving or changing the image consumers have of the product.

A wide range of factors must be jointly considered in formulating a promotion program including package design and size, pricing, merchandising techniques and assistance, product distribution procedures, advertising, and public relations of all types. It is unrealistic to formulate a mass advertising program unless the industry can assure adequate distribution and merchandising to complement the advertising. And it is unrealistic to formulate a mass

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[1] Frederick V. Waugh (ed.), Readings on Agricultural Marketing (Ames: The Iowa State College Press, 1954), p. 414.

advertising program for a product that is inadequate with regard to quantity, package size and price.

Advertising program planners must make decisions about the types of media that will be most effective and about the extent of the advertising, whether it should be national, regional or local in scope. Newspapers, for example, usually have lower rates for local advertisements than for national advertisements. There is considerable variation between the costs and returns of an advertisement on radio and on television and other media.

Tart cherries are promoted as a commodity by several states and a national organization. In addition, considerable brand promotion is conducted by processors and food brokers. The National Red Cherry Institute has been established to conduct national promotion of the commodity. State marketing orders are in effect in New York and Wisconsin to collect promotional funds. Michigan has a state law which has established a Cherry Commission to collect funds on a check off basis. Pennsylvania and Ohio have voluntary programs whereby growers contribute two dollars per ton for promotion of their tart cherries.

These programs tie collections and contributions to production which is variable. In an average year, however, about 250,000 dollars is available for commodity advertising and promotion. This amounts to between one-half and one percent of the producer value of the tart cherry crop.

In addition it is estimated that at least 250,000

dollars is spent annually by tart cherry processors for brand promotion. This amount of funds is not tied closely to production. In the past two years heavy promotional programs have been undertaken by three large processors of cherry pie filling. Two are attempting to establish national distribution of their brands by promotional activities and advertising. Large sums of money were spent in 1959, 1960 and 1961 to develop a market for jellied cherry sauce, a new product that has not been readily accepted by consumers.

A variety of advertising programs are in effect. Since at least half of the annual cherry pack is for the institutional market, a large part of the advertising is aimed at pie bakers, preserve manufacturers, candy makers and other institutional users. These programs attempt to push tart cherries through the marketing channels to consumers. Trade magazines receive a lot of this advertising business.

Most of the brand advertising and promotion is designed to "pull" tart cherries through the market by developing a favorable consumer image of the product. Point-of-purchase material is widely used as well as newspapers and magazines. Place mats are available for restaurant use.

Most of the emphasis is on media advertising.[1]

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[1]The 1962-63 budget of the National Red Cherry Institute listed $108,000 for institutional and trade advertising, $52,000 for consumer food publicity and tie-in advertising, $37,000 for recipes and National Red Cherry Recipe Contest and $53,000 for operating expenses and reserve funding, for a total of $250,000. Data obtained from Ted Stebbins, Secretary, Michigan Cherry Commission, Grand Rapids, Michigan.

Some effort is aimed at improving retail merchandising by the use of field personnel. But this activity is expensive and not readily accepted by large retail chains who have merchandising specialists and policies of their own.

When formulating an advertising program the industry must consider potential benefits and costs of alternative methods of affecting consumers' images of the products. It must also take into consideration the institutional inertia which might inhibit the adoption of new ideas to bring about favorable changes in how consumers view a product.

For purposes of this discussion only the commodity (as opposed to brand) promotion will be considered. No attempt will be made to evaluate the promotional programs of the various tart cherry packers. Historically the National Red Tart Institute's funds have been spent for commodity rather rather than brand promotion since no differentiation of product between states and regions of production is possible or realistic. Thus, New York promotion can benefit Pennsylvania growers and processors, Michigan promotion can benefit the New York and Pennsylvania industries and so on.

One alternative program which should be considered by the industry is to expand the direct merchandising assistance available from the National Red Cherry Institute and also strengthen the state programs in supporting promotional activities such as product and package design and size, pricing, development of improved merchandising techniques, product distribution schemes, public relations and defining promotional objectives. These supporting promotional functions can

probably be most effectively operated at the state level since the public agencies and institutions able to assist in these programs are more available to the state organizations than to a national group. Financial grants and close liaison between the public institutions and the secretary-managers of the state associations could be very conducive to the success of supporting programs such as those discussed here. The cost of redirected state programs would not necessarily have to be substantially increased over current levels since state promotional organizations are already in operation in the major producing states. It would, however, involve some reorganization of current efforts and activities of some state promotional activities.

The state promotional organizations are perhaps in a favorable position to develop supporting promotional programs along the following lines.

Package design and size.--The basic retail sized canned tart cherry product is the number 303 water packed can. This product has declined in popularity since it replaced the number 2 can as the predominant retail canned pack in the 1950 to 1956 period. Two and one-third million cases were packed in 1955. The pack has declined since then so that even in the bumper crop year of 1962 only slightly more than 2 million cases were packed.[1] This decline in retail canned pack occurred despite the general increases in

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[1]Oldenstadt, op. cit., Economic Relationships in Red Tart Cherry Marketing 1947-1962, p. 26.

population and consumer disposable income which occurred during the same period. Part of this decline reflects the growth in popularity of canned pie filling which has occurred since 1955 and part of the decline undoubtedly resulted from the wide range of improved substitute dessert items now available. The number 2 can contains approximately 20 ounces of product on a net weight basis while the number 303 can contains approximately 16 ounces. The question of the adequacy of the smaller can for household use should be explored. Do some consumers find the 16 ounce 303 can too small to make a satisfactory pie? Or are tart cherries packed in water too difficult to use in this form? Perhaps if these questions could have been adequately raised and answered before the can size was changed processors would have resisted the use of the smaller can size.

State promotion groups should be encouraged to explore alternative package designs and assist in bringing about necessary changes. Personnel in the packaging schools at the university level could be consulted and market tests made of alternative label designs and colors.

Pricing.--There is a relationship between product price and movement of tart cherry products at retail. Allegations have been made that retailers often do not pass on price decreases to consumers thereby inhibiting product movement through the marketing channels at times when supplies are larger than normal.[1] Part of this problem is related to

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[1]The Canning Trade, Magazine, December 17-24, 1962, p. 5.

the characteristic lag in price movements at the retail level. Hence a relevant question is not whether this lag should occur but how the price adjustment can be accelerated. A retailer will be encouraged to make a downward price adjustment if his nearest competitor has previously done so and his sales are falling off. But a retailer might also be willing to make a price adjustment in the absence of price competition if he is informed of the supply situation and the desirability of not having a large year-end carryover. Strong commodity promotion organizations at the state level could provide valuable assistance by helping to inform retailers of the need for such price adjustments.

Merchandising assistance.--There is undoubtedly some favorable relationship between advertising and merchandising assistance by direct contact with the trade. In general, promotional activities would be combined so that the ratios of their marginal value products to their prices would be equal to each other and equal to one. But data on these ratios are not available. It is possible, however, to indicate what combinations of advertising and direct merchandising assistance are possible given the total funds available and assuming that it costs 15,000 dollars per year to keep a field man on the job. Figure 11 shows the number of fieldmen on the vertical axis and the money spent on media advertising on the horizontal axis. If the total annual available fund at the national level is 150,000 dollars, this could all be used to buy media advertising at point A or would support ten field men or merchandising assistants at point B. A line

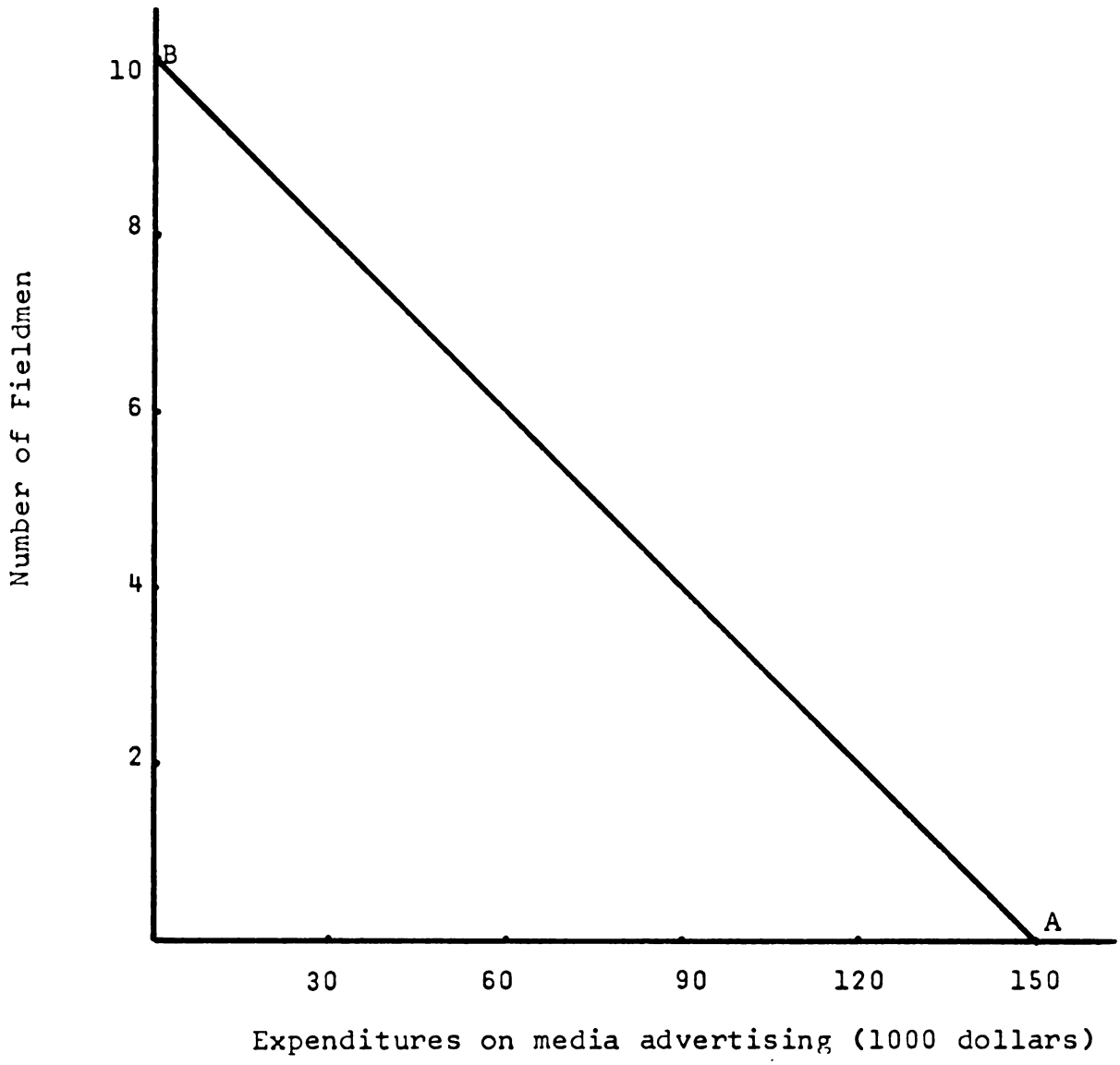

Fig. 11.--Possible combinations of merchandising assistants and media advertising with an annual expenditure of 150,000 dollars.

drawn between these two points on the axes shows all possible combinations of media advertising expenditures and merchandising assistants. The economic choice criterion for selecting the optimum combination given the fund restriction would be the point at which the line in Figure 11 was tangent to the highest possible line on a superimposed product transformation map. While such a map is not available, it seems reasonable to suggest that some combination of merchandising assistance and media advertising would be more desirable than all of one or the other.

Product distribution.--An advertising program in a particular market is wasted if the product distribution to that market is inadequate. State promotional organizations for tart cherries can serve a very useful function if they work closely with processors to inform them where and when an advertising program will occur and help to insure adequate stocks and merchandising schemes in the markets being served. Coordination of commodity and brand advertising can also be improved by a closer working arrangement between brand advertising agencies and the state promotional organizations. Obviously this coordination should also occur between the National Red Cherry Institute and the processors and the advertising agencies serving them.

Public relations.--A significant contribution to the tart cherry industry could arise through a well planned and executed public relations program. This area of emphasis could be expanded by the state promotion organizations. Food

editors of magazines and newspapers could be contacted periodically and provided with recipes and information on new products, the pack and harvest situation and other relevant information about the tart cherry industry. The importance of the tart cherry industry to the states and nation should continually be reemphasized. The results of market tests and experiments should be made available to news media. Even the technical aspects and developments of tart cherry production and harvesting can be used in a strong public relations program.

Defining promotional objectives.--The final area of tart cherry promotion to be discussed involves the formulation of goals and objectives. The vice-president of a national marketing research corporation has suggested that the use of market research in setting purposeful objectives for a promotion is "an astonishingly neglected area."[1] He then made a plea for laying out meaningful and productive objectives for promotional work which specify in greater detail what a promotional campaign is being designed for. The following examples of meaningful promotional objectives were provided:

1. To attract new users for the product.
2. To raise the purchase rate of younger housewives, who currently lag behind the national average.

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[1]Curtis C. Rogers, "The Role of Research in Developing Promotional Programs," Proceedings of National Workshop on Promotion of Farm Products (Michigan State University and the Economic Research Service, U. S. Department of Agriculture, processed as ERS - 58, U. S. Department of Agriculture, 1963).

3. To get buyers to trade up to a larger package size.
4. To encourage additional uses of the product.
5. To counteract promotions by competitive products, at key seasons of the year.
6. To regain lost customers.

Specification of objectives helps the promotion group evaluate results of their promotional expenditures and more importantly, it gives meaning and direction for program planners. It can lead to the development of new promotion approaches and techniques and can mean a break with the traditional and often antiquated techniques.

Economic Feasibility

The economic feasibility of a promotional program hinges on relative costs and returns of the program. Weinberg suggests that the key question faced by a firm's management is that of determining the most profitable trade-off between an improved ratio of company sales to industry sales and a lower ratio of company profit to company sales.[1]

A parallel question faces an agricultural commodity group considering a promotion effort, i.e., what is the most profitable "trade-off" between an improved ratio of their commodity sales to total food sales and a weakened ratio of commodity group profits to commodity sales?

The question suggests that the relevant variables

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[1]Robert S. Weinberg, An Analytical Approach to Advertising Expenditure Strategy (New York, N. Y.: Association of National Advertisers, Inc., 1960), p. 11.

to consider in a promotional feasibility study include the commodity group's share of total food sales and the costs and net profit situations under alternative promotional strategies. And it is implicit that both short and long-run benefits and costs should be considered.

Such data are usually lacking in actual practice. But despite this void, considerable funds are allocated by producers and processors for commodity promotion.

A study conducted in 1958 and 1959 found over 1,100 agricultural promotion groups which spent about 67 million dollars during the fiscal year ending in 1958.[1] In many instances the promotional objectives of the promotion groups were not clearly defined. There was a general satisfaction on the part of the group leaders with the adequacy and effectiveness of their promotional programs, but little or no specific, objective appraisal of promotion efforts.[2]

The following analysis is an attempt to provide information on one aspect of the promotion costs and returns question, i.e., what will be the price and revenue effect of increasing per capita demand by one-tenth pound at all

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[1]Robert E. Frye and Violet D. Grubbs, Promotion of Farm Products By Agricultural Groups (U. S. Department of Agriculture, Economic Research Service, Marketing Research Report No. 380, January 1963), p. 3.

[2]Robert E. Frye, Harper W. Boyd, Jr., and Ralph Westfall, Advertising Procedures and Practices of Agricultural Commodity Promotion Groups (Washington, D. C.: U. S. Department of Agriculture, Economic Research Service, Marketing Research Report No. 567, November 1962), pp. 21-22.

price levels.

Assume that the objective of a promotion program in the tart cherry industry is to raise per capita demand by .1 pound per year. This is an increase of 1.6 ounces per person per year or equivalent to about the quantity of cherries in one more piece of cherry pie per person per year. Given existing demand conditions as estimated in Figures 4, 6, and 7, the assumed objective would be to increase the demand curve at retail by .1 pound at each price level. Under the additional assumption that the marketing margins at retail and at the processor levels would remain the same, the demand curves at the processor and producer levels would also move to the right by .1 pound at each price level.

This can be viewed alternatively as a promotional program that increases the price at which consumers are willing to purchase various quantities of tart cherries. For example, where a per capita demand of 1.3 pounds was associated with a retail unit price of 30.24 cents, the assumed advertising and promotional program would lead to 1.3 pounds per capita being associated with a per unit price of 30.71 cents. In either case the demand curve has moved upward and to the right under the assumption that the promotional objective has been met as shown by the hatched line in Figures 12 and 13.[1]

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[1]No allowance has been made for the possibility that the promotion program will change the slope of the demand curve. This is a refinement that would require additional assumptions and produce a different result.

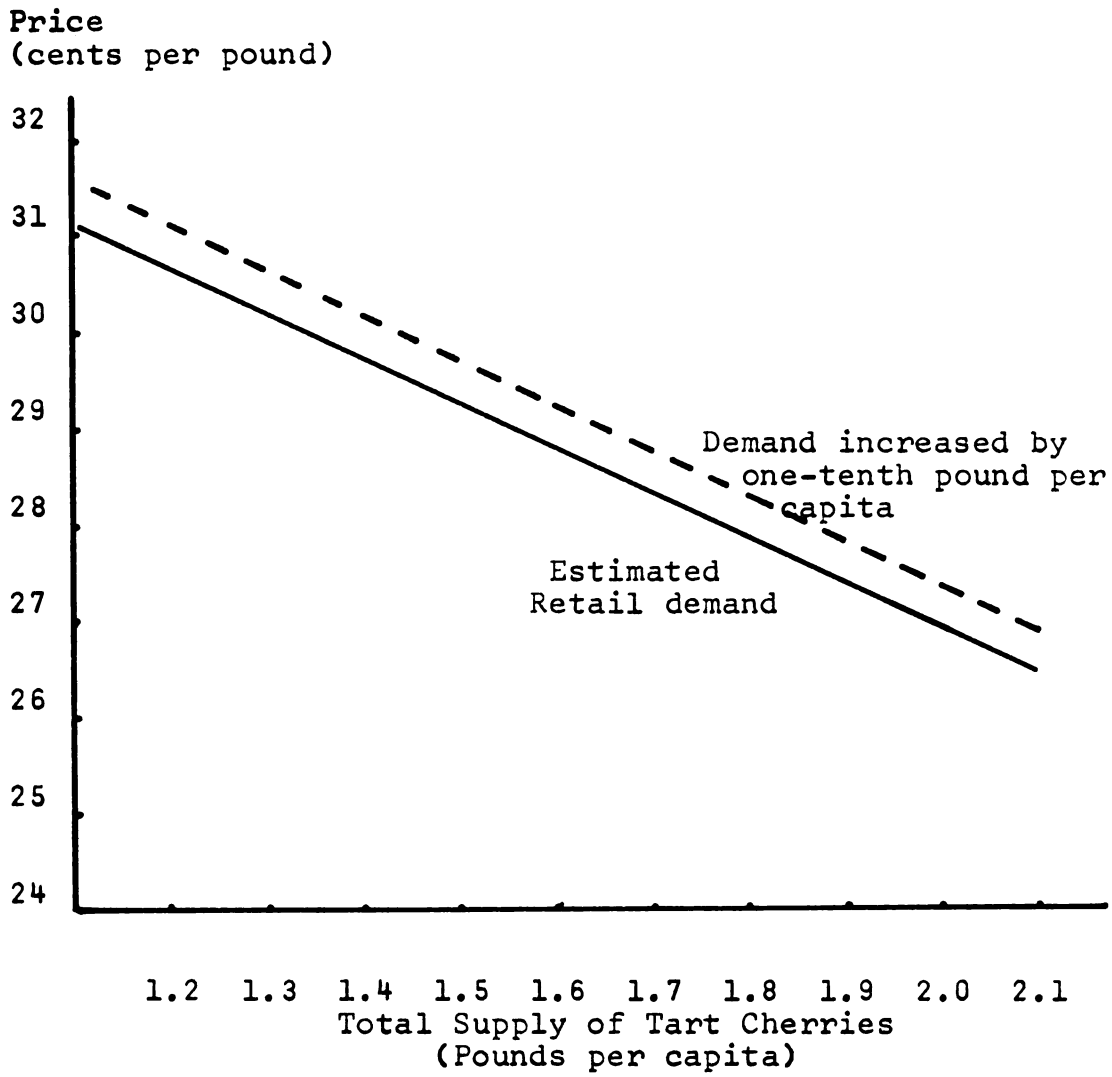

Fig. 12.--Tart cherries: Estimated demand at retail and change in demand of one-tenth pound per capita at all prices when processor-retailer margin is a constant 15 cents per pound.

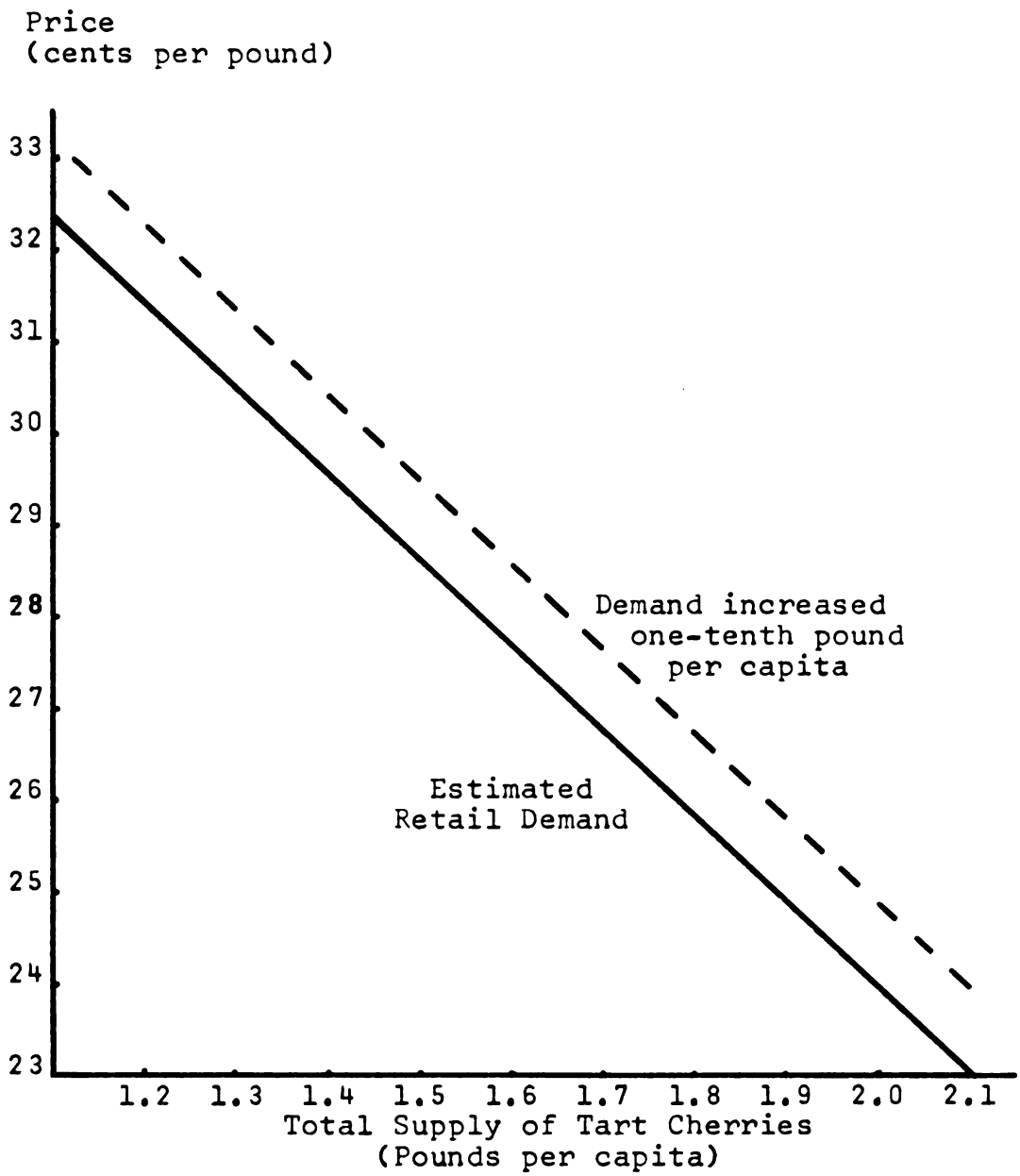

Fig. 13.--Tart cherries: Estimated demand at retail and change in demand of one-tenth pound per capita at all prices when processor-retailer margin is a constant 50 percent of retail price.

Data represented by these graphs are shown in tabular form in Tables 2 and 3. Data in Figure 12 correspond with those in Table 2 and represent retail demand under the assumption that the processor-retailer marketing margin is constant at 15 cents per pound. Data in Figure 13 correspond with those in Table 3 and represent retail demand under the assumption that the processor-retailer marketing margin is constant at 50 percent of retail price. In actuality the processor-retailer margin is probably somewhere between these two limiting cases.

Column 1 of Table 2 lists per capita total supply while column 2 converts this to total pounds by multiplying per capita total supply by estimated population of 190 million. Column 3 relates retail prices to total supply. These prices can be read from the solid line in Figure 12. Total revenue (price multiplied by total pounds) is listed in column 4. Columns 1 through 4 summarize price, quantity and revenue conditions which existed over the 1947-62 period adjusted for the 1964 population level.

Columns 5 and 6 show retail prices and total revenues under the assumption that demand can be increased .1 pound per capita through an expanded promotional program.

Column 7 then shows differences in total revenue or, alternatively, shows what additional total revenue could be expected if the promotional objective were met. Column 7 data thus indicates the potential gross returns of an expanded promotional program. An alternative way of looking at the data in column 7 is to consider this revenue as the

TABLE 2.--Estimated effect on price and total revenue when United States per capita demand increases one-tenth pound and when processor-retailer margins are a constant 15 cents per pound of raw product equivalent.

Total Supply		1947-62 Relationship		New Promotion 2/		
Lbs. Per Capita	Total Lbs. (millions) 1/	Price Per Lb. Raw Prod. Equiv. (cents)	Total Rev., T.R. (1000 $)	Price Per Lb.' Raw Prod. Equiv. (cents)	Total Revenue' T.R.' (1000 $)	Difference in Total Revenue TR' - TR (1000 $)
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1.2	228	30.71	70,018.8	31.18	71,090.4	1,071.6
1.3	247	30.24	74,692.8	30.71	75,853.7	1,160.9
1.4	266	29.77	79,188.2	30.24	80,428.4	1,250.2
1.5	285	29.29	83,476.5	29.77	84,844.5	1,368.0
1.6	304	28.82	87,612.8	29.29	89,041.6	1,428.8
1.7	323	28.35	91,570.5	28.82	93,088.6	1,518.1
1.8	342	27.87	95,315.4	28.35	96,957.0	1,641.6
1.9	361	27.40	98,914.0	27.87	100,600.7	1,686.7
2.0	380	26.93	102,334.0	27.40	104,120.0	1,786.0

[1]Pounds per capita multiplied by population estimate of 190m.

[2]Assuming promotional objective of increasing per capita demand by .1 pound per year is met.

TABLE 3.--Estimated effect on price and total revenue when United States per capita demand increases one-tenth pound and when processor-retailer margins are a constant 50 percent of retail price.

Total Supply		1947-62 Relationship		New Promotion 2/		Difference in Total Revenue TR' - TR (1000 $)
Lbs. Per Capita	Total Lbs. (millions) 1/	Price Per Lb. Raw Prod. Equiv. (cents)	Total Rev., T.R. (1000 $)	Price Per Lb.' Raw Prod. Equiv. (cents)	Total Revenue' T.R.' (1000 $)	
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1.2	228	31.44	71,683.2	32.39	73,849.2	2,166.0
1.3	247	30.50	75,335.0	31.44	77,656.8	2,321.8
1.4	266	29.55	78,603.0	30.50	81,130.0	2,527.0
1.5	285	28.60	81,510.0	29.55	84,217.5	2,707.5
1.6	304	27.66	84,086.4	28.60	86,944.0	2,857.6
1.7	323	26.71	86,273.3	27.66	89,341.8	3,068.5
1.8	342	25.77	88,133.4	26.71	91,348.2	3,214.8
1.9	361	24.82	89,600.2	25.77	93,029.7	3,429.5
2.0	380	23.87	90,706.0	24.82	94,316.0	3,610.0

[1]Pounds per capita multiplied by population estimate of 190m.

[2]Assuming promotional objective of increasing per capita demand by .1 pound per year is met.

maximum amount that could realistically be spent on an expanded promotional program.

If the retail to producer margin is a fixed absolute amount of 15 cents as assumed in the first case (Table 2) and if producers financed the promotion so that the retail and processing costs and margins did not change, the added gross revenue shown in column (7) of Table 2 would be available to producers, providing the objectives of the promotional program were met.

Similar data are shown in Table 3 for the constant percentage margin case. If the retail to producer margin is a fixed percentage margin of 50 percent of retail price as assumed in the second case (Table 3) and if producers financed the promotion so that the retail and processing costs and margins did not change, not all of the added revenue as shown in column (7) of Table 3 would be available to producers as shown by the following equations:

Under the assumption of a 50 percent processor-retailer margin,

$$P_r = \frac{P_p}{.5}. \qquad (1)$$

And since a constant absolute processor-producer margin of 6 cents prevails and $P_p = P_f$, equation (1) can be rewritten as:

$$P_r = \frac{6 + P_f}{.5} \qquad (2)$$

$$.5P_r - 6 = P_f \qquad (3)$$

Now assume that P_r is increased by a constant C through a promotion program. Then equation (3) becomes

$$P_f = .5(P_r + C) - 6$$

$$P_f = .5P_r + .5C - 6 \quad (4)$$

Equation (4) shows that only half the price increase at retail is reflected back to the producer level. Thus it may be assumed that at most only half the revenue increase shown in column (7) of Table 3 would be available to producers.

On the other hand, joint promotion by retailers and producers would raise retail costs and margins thereby reducing the expected gross returns and costs from the promotion at the producer level. Three of the questions which remain unanswered by this analysis are: Who would undertake the increased promotional program, how would it be done and what would be the total cost of effectively influencing demand by .1 pound per capita? Only the potential gross revenue returns have been discussed. Yet, this is a very important result since it gives one estimate of the returns available to the industry through an expanded promotional program.

The analysis above does suggest that a promotion program designed to increase per capita demand by .1 pound could increase gross returns by more than one million dollars annually. If the total annual promotional cost of such a program is less than the added returns, the industry would in the short-run, stand to gain by the amount of the difference.

A promotion program of the type discussed above is, however, a long run venture. If such a program is effective,

it is reasonable to expect that increased supplies would be forthcoming because of the increased prices and net revenues available to tart cherry producers. Dennis has estimated the long run supply response for tart cherries as follows:[1]

$Q^s = 209.7721 + 2.24117P$

P = current grower price in dollars per ton

Q^s = future annual production of tart cherries in million pounds

The 1955-60 average grower price of tart cherries was 144 dollars. If the promotional objective of increasing tart cherry demand were met as discussed above and the increased revenue was available to growers, it would increase their price about .5 cents per pound or about 10 dollars per ton to 154 dollars. The expected future annual production due to the supply response was estimated to be 12.4 million pounds by solving the above equation for Q^s at 144 dollars and 154 dollars per ton and finding the difference in total output.

Another consideration is the effect higher prices will have on consumers' tastes and preferences and, hence, demand in the long run. Shepherd says, "There are reasons for believing that these elasticities [for items covering more than a year] based on long-time data may be greater than the elasticities based on annual data."[2] This change in elasticity occurs in the

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[1]Carleton C. Dennis, Long-Run Equilibrium in Tart Cherry Production (Michigan State University Agricultural Experiment Station Technical Bulletin 291, 1963) p. 13.

[2]Geoffrey S. Shepherd, Agricultural Price Analysis (Ames: The Iowa State College Press, 4th ed., 1957), p. 66.

longer run because consumers will shift to substitute products. Since no appropriate long-run demand estimates are available, the changes in consumers' tastes and preferences cannot be determined. But the fact that increased price through promotion could affect future demand must be borne in mind when considering such promotional schemes.

Product Development

The tart cherry industry has been active in product development in the past decade. A very successful product, tart cherry pie filling, was introduced on a commercial scale in 1955. About 45 million pounds of tart cherries were utilized in producing cherry pie filling in 1962. It provides consumers with a ready-to-use dessert item which is acceptable for pie filling, ice-cream topping and other recipes. Four major and several minor processors supply the bulk of the total cherry pie filling pack.

A new product called jellied cherry sauce was introduced in 1959. It gained rapid early success but has since declined in popularity. The reasons for its decline are many and complex and will not be discussed here.

Other new products on the horizon are of a specialty nature and include "cherry nuggets," which are dried cherries similar to raisins in conformation and texture. A program to introduce a 16 ounce retail pack of individually quick-frozen-cherries is currently underway in Michigan and an 18 ounce package is being prepared for the New York market. The new dehydration techniques such as freeze drying and puff-drying

can be used on tart cherries when and if these techniques become economically feasible.

The Great Lakes Cherry Producers Marketing Cooperative, Inc., has devoted considerable resources to the introduction of frozen cherries to European bakers and institutional users of food products and in the process have been concerned with new preserving techniques and handling methods.

Product development is expensive and an uncertain undertaking. It requires a large capital outlay, an adequate research and education program and a desirable product. Innovation is the basic ingredient in the success of a product development program. New merchandising and promotional techniques are often as effective as new product design.

From the point of view of the consumer, a product must fill a felt need whether real or imagined. Retailers must be convinced that there exists an innate or developed demand for the commodity, that they can realize an adequate profit through a favorable margin and turnover and that the product can compete with other products for shelf space in the stores.

The product mix.--The product mix of the tart cherry industry has changed gradually over the years since 1938 with frozen products gaining in importance relative to canned products. Table 4 shows the percentages of the total pack going into the various products at pack time for the period 1938-62.

TABLE 4.--Proportion of total tart cherry pack going into frozen, canned and other products, United States, 1938-1962.

Year	Canned	Frozen	Other	Total
	- - - - percent - - - -			
1938	74.7	20.4	4.9	100.0
1939	73.3	22.7	4.0	100.0
1940	70.6	24.0	5.4	100.0
1941	60.1	35.4	4.5	100.0
1942	71.7	25.7	2.6	100.0
1943	48.2	50.0	1.8	100.0
1944	59.1	38.3	2.6	100.0
1945	72.1	25.7	2.2	100.0
1946	55.2	43.6	1.2	100.0
1947	52.2	45.8	2.0	100.0
1948	57.2	39.8	3.0	100.0
1949	61.3	37.2	1.5	100.0
1950	61.8	37.2	1.0	100.0
1951	62.2	36.8	1.0	100.0
1952	67.6	31.8	.6	100.0
1953	50.6	48.7	.7	100.0
1954	54.3	44.8	.9	100.0
1955	56.8	42.0	1.2	100.0
1956	49.5	48.8	1.7	100.0
1957	47.6	51.6	.8	100.0
1958	50.2	49.0	.8	100.0
1959	54.6	44.7	.7	100.0
1960	40.4	58.5	1.1	100.0
1961	40.0	59.8	.2	100.0
1962	52.8	46.2	1.0	100.0
1963	42.8	56.2	1.0	100.0

Table 4 provides evidence that the market for frozen cherries has been developing while the market for canned tart cherries has declined. A closer view of the trends of individual tart cherry products will indicate the magnitude of these shifts.

Figure 14 traces the annual pack of 30 pound frozen tins of tart cherries from 1947 through 1963. It shows that the annual pack has trended upward over the post World War II period. The decline in 1962 reflects the higher than normal stocks of frozen 30 pound tins carried into the 1962 pack year and the fact that a relatively large part of the production went far canning. The decline in 1963 was due to the extremely small crop available for processing. In general, the upward trend in pack reflects the strong market which has been developed in the institutional trade plus the general decline which has occurred in the market for the number 303 canned hot pack and the fairly stable demand for the number 10 canned hot pack as shown in the following two charts, Figures 15 and 16.

Figure 15 traces the downward trend in the annual pack of tart cherries in number 303 cans in raw product equivalents. Figure 16 shows the annual pack of number 10 cans of tart cherries in terms of raw product equivalents. The trend in pack of number 10 cans has been fairly constant over the period although the annual fluctuations in pack have been fairly large. The large annual fluctuations in quantity packed arises from two sources, large changes in annual

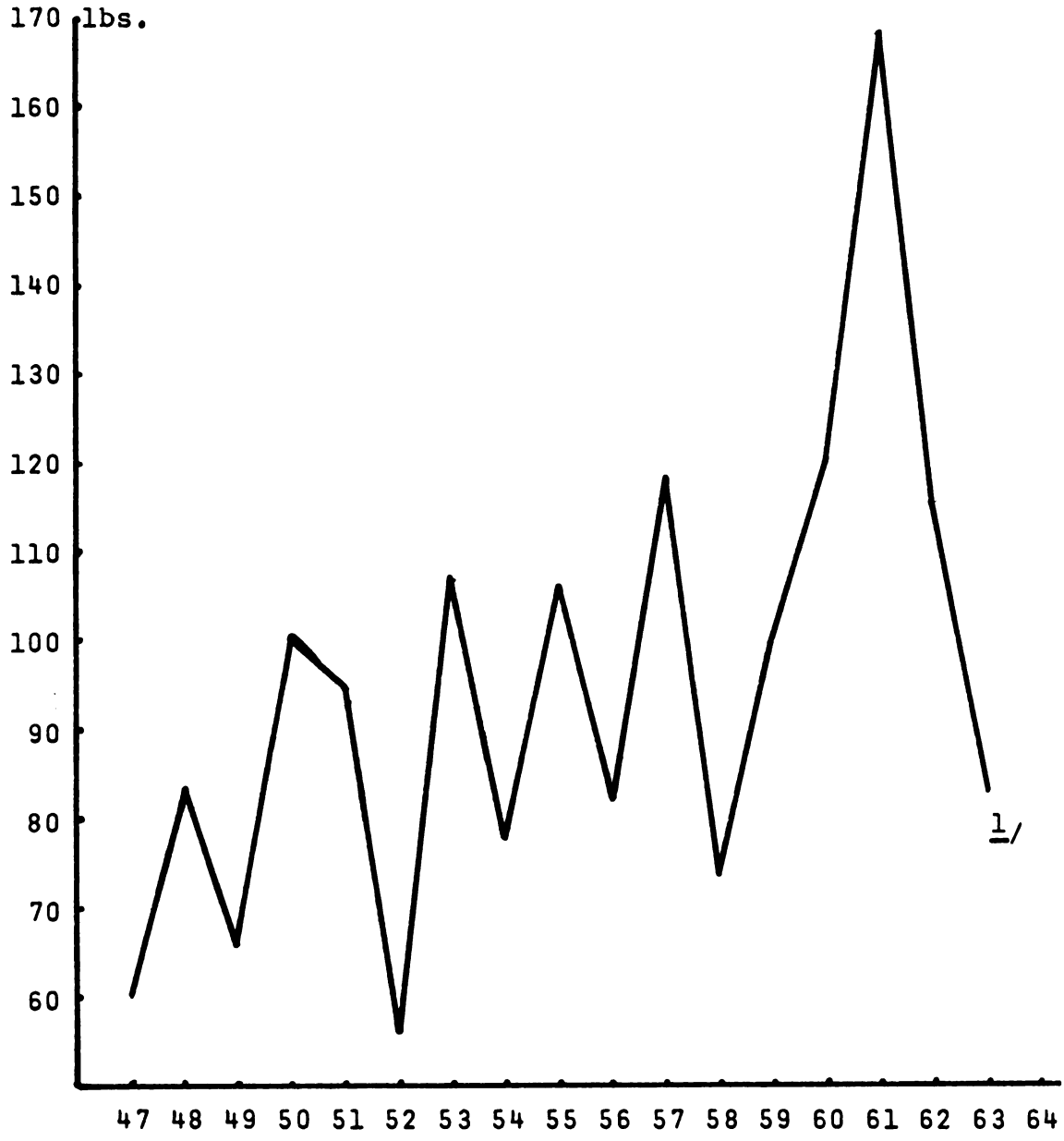

Fig. 14.--Annual pack of 30 pound frozen tins of tart cherries, U.S., 1947-63.

Fig. 15.--Annual pack of No. 303 canned water packed tart cherries in raw product equivalents, U. S., 1947-63.

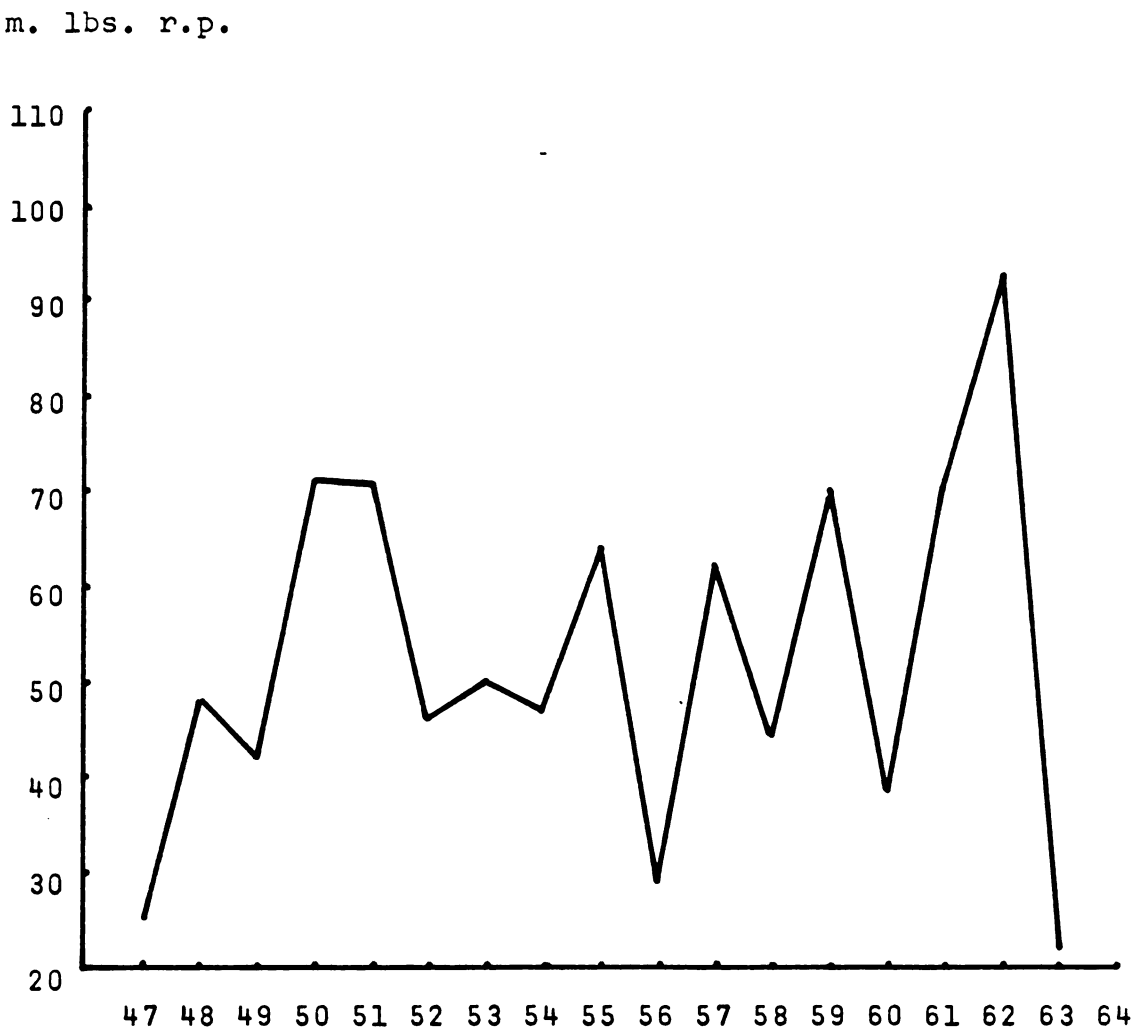

Fig. 16.--Annual pack of No. 10 canned water packed tart cherries in raw product equivalents, U. S., 1947-63.

production in the U. S. and from changes in the product mix.

The canned pie filling pack has not fluctuated drastically from year-to-year but has exhibited a strong upward trend since 1955, Figure 17. The growth of this pack demonstrates the potential that exists in the retail market for a new, improved tart cherry product.

The retail size frozen tart cherry products include the 16 and 20 ounce frozen dessert tart cherries and other packages less than 20 ounces. They accounted for a relatively small part of the total pack but they are being packed in increasing quantities as shown in Figure 18.

Frozen tart cherries packed in 55 gallon metal barrels are another minor product although the quantity of this pack has increased rapidly since 1958, Figure 19. They are used by pie manufacturers and for remanufacturing into pie filling and other products throughout the marketing year.

The remainder of the annual pack of tart cherries can be classified as other frozen products and is shown in Figure 20. This pack is assumed to be mainly in number 10 cans, individually quick frozen (I.Q.F.) tart cherries and other packages larger than 20 ounce but excluding packages 20 ounces or less, 30 pound tins and 55 gallon barrels.

In summary, the preceding charts indicate the general trends which have occurred since 1947 in the annual packs of the various tart cherry products. Only two products have undergone significant advancement in the market, frozen tart cherries primarily in 30 pound tins and canned retail sized tart cherry pie filling. The trend in pack of number 10 canned

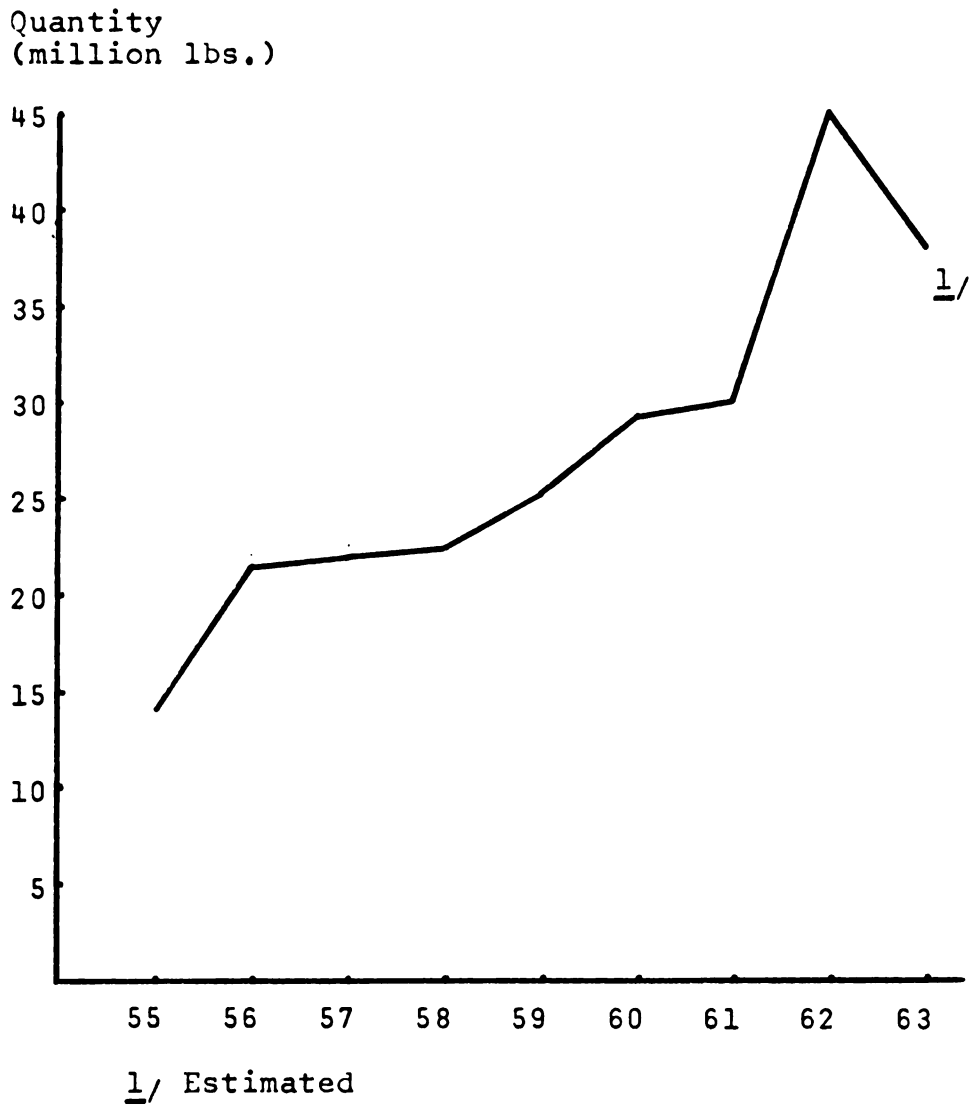

Fig. 17.--Annual pack of canned tart cherry pie filling in raw product equivalents 1955-63.

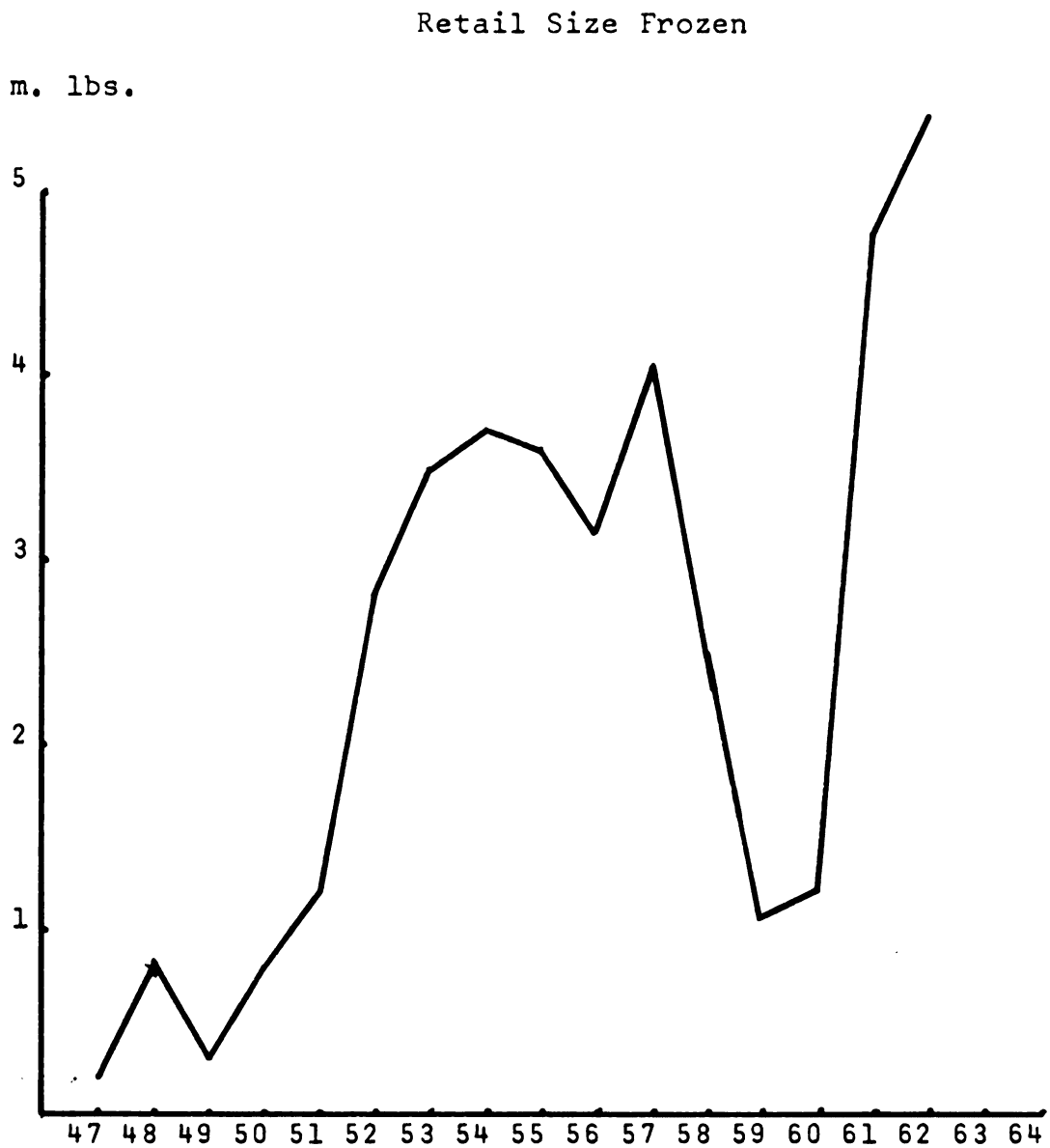

Fig. 18.--Annual pack of retail size frozen tart cherries in raw product equivalents, 1947-63.

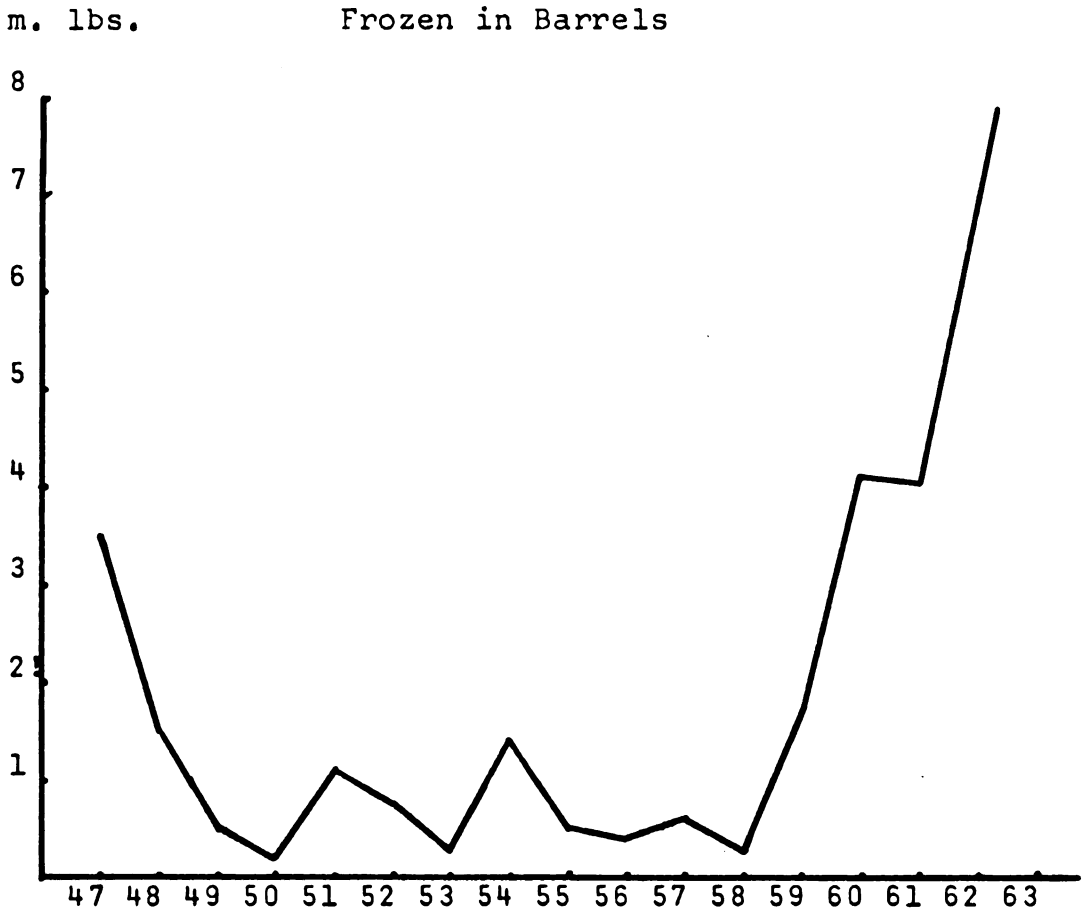

Fig. 19.--Annual pack of 55 gallon barrels of frozen tart cherries in raw product equivalents, 1947-63.

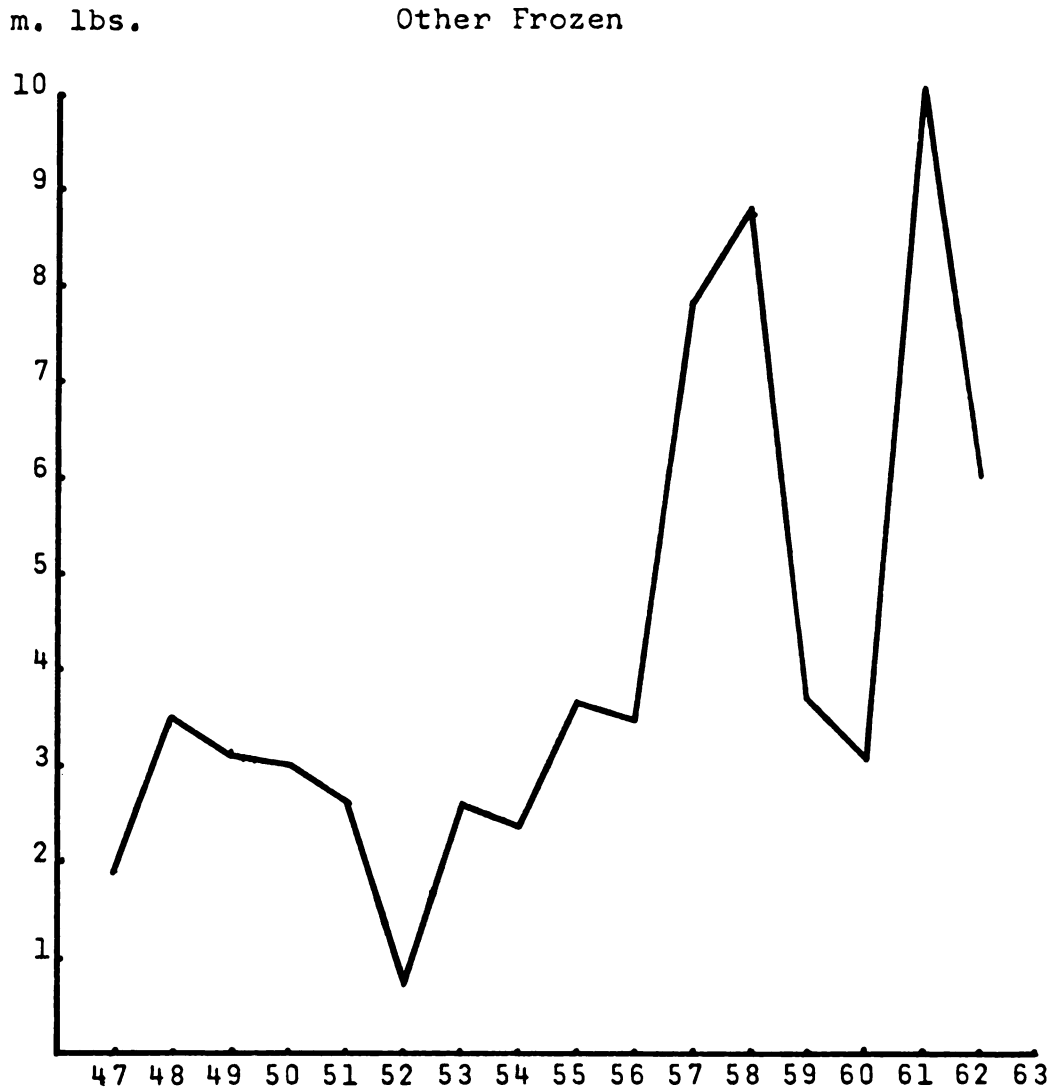

Fig. 20.--Annual pack of frozen tart cherries in No. 10 cans and other package sizes, 1947-63.

tart cherries has remained fairly constant while the pack of number 303 canned tart cherries has declined.

The canned pie filling has, to a certain extent, offset the decline in consumption of canned water pack tart cherry product rather than adding to total cherry consumption. But despite this new product, per capita retail sales of canned tart cherries have declined in recent years as shown by the movement of number 2 canned pie filling and number 303 water packed tart cherries in Table 5.

These data clearly indicate that the retail market for tart cherries is in need of an extensive program of market and product development if it is to regain its place as an important outlet for tart cherries.

There is a definite trend toward increased consumption of frozen retail pies. Nye estimated that 12 million pounds of frozen tart cherry pies were sold at retail in 1955.[1] In 1961 this outlet accounted for 55 million pounds. Home baked cherry pie, on the other hand, declined from an equivalent of 97 million pounds in 1955 to 75 million pounds in 1961. The other large pie manufacturing segment, fresh baked commercial pies declined slightly from 115 million pounds of tart cherry equivalents in 1955 to 110 pounds in 1961.[2]

Thus the trend in tart cherry consumption has been toward the convenience items, frozen pies and canned pie

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[1] Nye, op. cit., p. 83.

[2] Ibid., p. 57.

TABLE 5.--Movement of retailed sized canned pie filling and water packed tart cherries, 1951-1963.

Year	Pie Filling	Number 303 Canned Water Pack	Total Movement	Per Capita Movement	Four Year Moving Average Per Capita Movement
		- - - lbs. of raw product equivalent - - -			
1951	---	94,535,000	94,535,000	.617	---
1952	---	83,957,500	83,975,500	.539	---
1953	---	76,427,500	76,427,500	.482	---
1954	---	55,197,500	55,197,500	.343	.4952
1955	13,100,928	90,155,000	103,255,928	.630	.4985
1956	19,260,528	48,957,500	68,218,028	.409	.4660
1957	20,955,024	55,047,500	76,002,524	.448	.4575
1958	21,675,456	42,100,000	63,775,456	.369	.4640
1959	23,784,180	60,850,000	84,634,180	.482	.4270
1960	25,005,672	30,625,000	55,630,672	.310	.4022
1961	27,641,028	34,050,000	61,691,028	.338	.3748
1962	41,762,772	50,782,200	92,544,972	.500	.4075
1963	40,000,000[e]	19,000,000[e]	59,000,000[e]	.314	.3655

[e]Estimated

filling and away from the products requiring more home preparation. This phenomenon is likely to continue with increases in incomes and levels of living. It thus seems evident that new product development must be directed toward providing more convenience items. It also seems evident that promotional programs need to be directed more toward educating consumers on the convenience aspects of the existing items.

Finally, if the water packed tart cherry products are to survive, it would seem desirable for food processors to develop and market test a pie ingredient containing starch, sugar and flavoring that could be added to water packed tart cherries to form a convenience pie filling. Also the use of low calorie ingredients in such a product and in pie filling should be explored since the trend is toward more convenience and fewer calories.

Data in Tables 2 and 3 are appropriate for determining the price and income effects of a new product which increases per capita demand for tart cherries. If a new product increases demand by .1 pound per capita the increase in total revenue is the same as shown in columns (7) of Tables 2 and 3. Fractional increases in demand can be easily computed since there is a linear relationship between per capita demand and price.

The costs of producing and marketing a new product vary by type of product, number of near substitutes and other factors not studied in this analysis. It remains for the industry to determine the cost and net revenue potential of new product development.

Location of markets.--Marketing people hold differences of opinion about whether a product should be promoted heavier in an already established market or whether they should devote time and money to open new markets. One of the first questions raised is, where are products currently being sold? While complete information on geographic distribution of tart cherries is unavailable in published form, some information has been developed to indicate the distribution of frozen institutional sales (30 pound tins) among the states, Table 6.

Column 1 in Table 6 gives an indication of total dollar sales of frozen institutional tart cherries to the states and regions. These sales are made to commercial pie bakers, preserve manufacturers, restaurants and institutional feeding establishments. Not all of the products manufactured by these purchasers are consumed in the states where the sales occurred, hence the total and per capita sales volumes in columns 3 and 4 are not necessarily equal to total and per capita consumption in the States and regions. The sales of tart cherries to a pie manufacturer with a regional or national distribution system, for example, would eventually be remanufactured and distributed in other states. Despite this limitation, the sales volume figures do give some idea of the state and regional consumption since pie bakers and, to a lesser extent, preserve manufacturers tend to be located near their market outlets rather than near their supplies of raw product.

The per capita volume figures in column 4 thus indicate which states and regions are low in consumption. The

TABLE 6.--Frozen tart cherries: Sales to institutions, in dollars and pounds by states and regions, calendar 1961.

State and Region	Sales Value		Sales Volume	
	Total	Per Capita	Total	Per Capita
	(1000 dollars)	(dollars)	(1000 pounds)	(pounds)
Connecticut	821	0.32	4,561	1.80
Maine	111	.11	617	.64
Massachusetts	1,872	.36	10,400	2.02
New Hampshire	87	.14	483	.80
Rhode Island	277	.32	1,539	1.79
Vermont	64	.16	356	.91
Total New England	3,232	.31	17,956	1.71
New Jersey	1,392	.23	7,733	1.27
New York	5,204	.31	29,737	1.77
Pennsylvania	1,171	.10	6,691	.59
Total Middle Atlantic	7,767	.23	44,161	1.29
Illinois	2,562	.25	15,527	1.54
Indiana	814	.17	4,933	1.06
Michigan	1,297	.17	8,106	1.04
Ohio	1,704	.18	10,327	1.06
Wisconsin	465	.12	2,818	.71
Total East North Central	6,842	.19	41,711	1.15
Iowa	255	.09	1,500	.54
Kansas	143	.07	773	.35
Minnesota	287	.08	1,688	.49
Missouri	190	.04	1,086	.25
Nebraska	142	.10	789	.56
North Dakota	28	.04	156	.25
South Dakota	28	.04	156	.23
Total West North Central	1,073	.07	6,148	.40
Delaware	77	.17	428	.96
Washington, D.C.	338	.44	1,878	2.46
Florida	811	.16	4,159	.84
Georgia	267	.07	1,443	.37
Maryland	375	.12	2,143	.69
North Carolina	238	.05	1,286	.28
South Carolina	135	.06	730	.31

TABLE 2.--Continued

State and Region	Sales Value		Sales Volume	
	Total	Per Capita	Total	Per Capita
	(1000 dollars)	(dollars)	(1000 pounds)	(pounds)
Virginia	323	.08	1,846	.47
West Virginia	107	.06	629	.34
Total South Atlantic	2,671	.10	14,542	.56
Alabama	339	.10	1,832	.56
Kentucky	306	.10	1,800	.59
Mississippi	188	.09	1,016	.47
Tennessee	386	.11	2,144	.60
Total East South Central	1,219	.10	6,792	.56
Arkansas	200	.11	1,081	.61
Louisiana	363	.11	1,911	.59
Oklahoma	461	.20	2,492	1.07
Texas	2,379	.25	12,200	1.27
Total West South Central	3,403	.20	17,684	1.04
Arizona	219	.17	1,095	.84
Colorado	463	.26	2,437	1.39
Idaho	135	.20	675	1.01
Montana	140	.21	718	1.06
Nevada	125	.44	625	2.19
New Mexico	147	.15	754	.79
Utah	106	.12	530	.59
Wyoming	83	.25	437	1.32
Total Mountain States	1,418	.21	7,271	1.06
Alaska	27	.12	113	.50
California	5,063	.32	25,315	1.61
Hawaii	16	.03	67	.11
Oregon	336	.19	1,680	.95
Washington	433	.15	2,165	.76
Total Pacific States	5,875	.28	29,340	1.38
Total United States	33,500	.20	185,605	1.035

Source: Quick Frozen Foods, October, 1962 is the source of data in Column 1, Column 2 was computed by dividing sales by state population estimates. Columns 3 and 4 were estimated by dividing dollar sales by average price of frozen cherries plus freight rate differentials to the various states.

regional per capita sales volume figures in column 4 are combined in Table 7 below.

TABLE 7.--Frozen tart cherries: Regional sales volume to institutional purchasers, converted to regional per capita volume, calendar 1961.

Region	Per Capita Sales Volume
	(pounds)
New England	1.71
Pacific	1.38
Middle Atlantic	1.29
East North Central	1.15
Mountain	1.06
West South Central	1.04
East South Central	.56
South Atlantic	.56
West North Central	.40

Source: Table 6.

Table 7 shows that the New England states led in per capita sales volume of frozen red tart cherries in calendar year 1961 followed closely by the Pacific Coast states. There was a noticeable decrease in the per capita sales volume in the last three regional groupings in Table 7.

Table 8 provides a list of the top 15 states with respect to total institutional sales volume of frozen tart cherries.

The 15 states listed in Table 8 accounted for 147,436,000, or 79.4 per cent of the total sales of 185,605,000 pounds. It is interesting to note that large quantities of 30 pound frozen tins moved from the producing states of Michigan, New York, Ohio, Wisconsin and Pennsylvania into distant

states including California, Texas, Florida, Oklahoma and Colorado.

TABLE 8.--Frozen tart cherries: The top 15 states in institutional sales volume, calendar 1961.

State	Sales Volume	
	Total	Per Capita
	(1000 Pounds)	(Pounds)
New York	29,737	1.77
California	25,315	1.61
Illinois	15,527	1.54
Texas	12,200	1.27
Massachusetts	10,400	2.02
Ohio	10,327	1.06
Michigan	8,106	1.04
New Jersey	7,733	1.27
Pennsylvania	6,691	.59
Indiana	4,933	1.06
Connecticut	4,561	1.80
Florida	4,159	.84
Wisconsin	2,818	.71
Oklahoma	2,492	1.07
Colorado	2,437	1.39
Total	147,436	

Source: Table 6.

This table indicates that the domestic market for frozen tart cherries is not necessarily concentrated in the producing areas, and that distant markets have been developed. It further indicates that the per capita sales volume of frozen tart cherries is greater in some distant states such as Colorado, California and Texas than it is in the primary producing state of Michigan. This fact provides evidence that still other states could probably absorb increased quantities of frozen tart cherries. Undoubtedly an adequate promotional effort would have to be undertaken to expand the use of this

product.

One of the difficult questions to consider in a market development program is whether to attempt an expansion of sales in an already established market or to attempt to open a new market where very little of the product is currently being used. The answer to this question hinges on the relative costs and returns expected from the two alternative approaches. Assessment of these costs and returns depends on reliable information obtained from market research designed specifically to measure the market potentials and the expected costs of providing the product to the markets.

One of the most important factors in the success of a market development program is the assurance of an adequate and continued supply of the product once it has been introduced. In the case of tart cherries, the highly variable nature of farm production means that supplies are often short. Long standing customers are generally favored in a short crop year making it difficult for new customers to maintain supplies of raw product. When this situation occurs a market development effort of the previous year may suffer drastic consequences. It will be shown later that the carry-over stocks generally do not adequately smooth out fluctuations in crop production.

There are several dimensions to a successful market development program. All the promotion, advertising and merchandising that can be financed and executed will be to no avail if processors as a group made poor decisions about what products to pack at harvest time. A short supply of

retail canned tart cherries may drive prices up to a point where consumers shift their purchases to an alternative or substitute product. When this occurs a market development program expenditure on this product is wasted. Some industry-wide coordination of market development and product mix may tend to alleviate this problem. Supply management programs that would help to even out the flow of tart cherries to market are considered in Chapter 5.

Government Purchase and Diversion Programs

Purchase and diversion programs by the federal government can have an important influence on prices and movement of tart cherry products. These programs have the effect of raising the demand schedule for tart cherries and can be considered, along with other demand stimulating programs, for their potential benefit to the industry.

Under existing legislation, federal purchases are made by the U. S. Department of Agriculture under Section 6 and Section 32 programs. Section 6 purchases are made specifically for the School Lunch program while Section 32 purchases are made for surplus removal and diversion to welfare agencies and other institutions as well as for distribution to schools under the School Lunch Program.[1]

The effect of School Lunch purchases has been

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[1]Murray R. Benedict, Can We Solve The Farm Problem (New York: The Twentieth Century Fund, 1955), pp. 284-289.

discussed by Southworth and Klayman.[1] There are two aspects of this program which are of particular interest to the tart cherry industry. First, is the fact that cherries served in school lunch cafeterias help form tart cherry consumption habits in students that may be carried on throughout their lives thereby increasing future tart cherry sales and consumption. Secondly, school lunch programs have been expanding rapidly around the country largely as a result of the federal program. This has resulted in a change from cold to hot lunches including tart cherry dessert items which are often difficult to include in a sack lunch.

Thus the school lunch program is a motivating force for increasing the rate of tart cherry consumption both now and in the future. There is, however, the possibility that school lunch programs replace normal sales by homemakers. But this eventuality is undoubtedly offset in large measure by the fact that school lunch program administrators at the local levels must supplement surplus donations by the federal government with purchases of their own. Southworth and Klayman reach the conclusion that, " . . . it is probable that no other method of surplus disposal brings farmers so large an increase in income per dollar of Government subsidy as does the School Lunch Program."[2]

The future of the School Lunch Program has recently

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[1] H. M. Southworth and M. I. Klayman, The School Lunch Program and Agricultural Surplus Disposal (U. S. Department of Agriculture Miscellaneous Publication No. 467, October 1941), p. 44.

[2] Ibid., p. 44.

been discussed by Assistant Secretary of Agriculture, George L. Mehren, who said, "The Department of Agriculture's regular purchases of canned foods for the School Lunch Program may be supplemented to some extent as we increasingly develop means for carrying this program to schools in economically depressed areas."

Mehren elaborated on the point made above that this program stimulates additional purchases of food products by school administrators by saying, "Of course, Department purchases for this program, although they are substantial, amount to only a fraction of what the schools themselves buy. The School Lunch Program is now the largest single institutional feeding operation in the Nation--and these schools spend some $675 million a year for locally-purchased foods."[1]

With regard to other benefits Mehren said, "The School Lunch Program also has the benefit of teaching children good dietary habits--and introducing them to foods for which they will later in life become good customers."

Table 9 shows the magnitude of Section 6 and Section 32 purchases of tart cherries from 1950 through 1963.

Several interesting facts are brought out in Table 9. First, tart cherries were purchased by the federal government in nine of the past 14 years. These purchases totaled slightly less than 2.5 million cases of canned cherries in equivalent

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[1]Washington Food Report, February 8, 1964. An excerpt of an address by George L. Mehren, Assistant Secretary of Agriculture at the 1963 National Canners Association Convention, Dallas, Texas.

TABLE 9.--United States Department of Agriculture purchases of canned tart cherries under section 6 and section 32 programs by years, 1950-63.1/

Crop Year	Program Section	Quantity			Fresh Equiv. (1000 pounds)	Total Expenditures (dollars)	Price Per Pound of Fresh equiv.
		Unit	Actual Cases	Equiv. Cases 24/2 1/2's			
1950	32	24/2's	282,245				
		6/10's	137,700				
		Total	419,945	321,433	13,350	1,880,267	14.1
1951	6	24/2's	97,255				
		6/10's	146,104				
		Total	243,359	201,522	8,470	1,226,884	14.5
1952	32	24/2's	14,810				
		6/10's	52,920				
		Total	67,730	58,905	2,494	321,895	12.9
1955	6	6/10's	257,296	236,712	10,090	1,354,383	13.4
1957	6	6/10's	227,906	209,674	8,938	1,263,867	14.1
1959	6	6/10's	403,485	371,206	15,822	2,153,666	13.6
1960	6	6/10's	179,056	164,732	7,022	1,081,114	15.4
1961	6	6/10's	297,786	273,963	11,678	1,858,829	15.9
1962	6	6/10's	612,820	563,794	24,032	2,803,506	11.7
Totals				2,401,941	101,896	13,944,411	

Source: Fruit and Vegetable Division, Agricultural Marketing Service, U. S. Department of Agriculture, Unpublished Worksheets, 1964.

1/ No purchases were made in 1963.

cases of No. 2 1/2 (24/2 1/2's) or over 100 million pounds in terms of raw product equivalent. Expenditures totaled almost 14 million dollars during the 14 year period. Secondly, only Section 6 funds for School Lunch programs have been used in the past few years, 1952 being the last year that Section 32 funds were expended for tart cherry purchases. Third, there has been an increase in the quantity of Section 6 purchases in recent years, with the all-time high reached in 1962 when more than 24 million pounds (raw product equivalent basis) were purchased at a total expenditure of more than 2.8 million dollars. The fact that no purchases were made in 1963 reflects the short crop and relatively high price which prevailed.

There is a tendency for U.S.D.A. purchases to be made in years when cherries are a relatively good buy which is, of course, associated with years of heavy production.[1] This situation is desirable from the industry's standpoint since purchases occur when there is the most need for them. These purchases, coming at a time when heavy supplies are tending to depress market prices, undoubtedly bolster the domestic market and hold up prices although the magnitude of this market force is difficult to measure and evaluate.

Column 4 in Table 10 shows the percent of total U.S. production purchased for the School Lunch Program and surplus diversion programs in each of the past 14 years. The purchases

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[1]Nye, op. cit., p. 118.

TABLE 10.--Tart cherries: United States production and U.S. Department of Agriculture purchases as a percent of production, 1950-1963.

Crop Year	U.S. production in million lbs.	Federal Purchases Under Section 6 and 32	
		in million lbs.	Percent of U.S. Prod.
1950	310.4	13.4	4.3
1951	313.6	8.5	2.7
1952	234.0	2.5	1.1
1953	263.0		
1954	212.6		
1955	298.2	10.1	3.4
1956	198.0		
1957	293.4	8.9	3.0
1958	206.8		
1959	276.2	15.8	5.7
1960	232.2	7.0	3.0
1961	330.8	11.7	3.5
1962	353.4	24.0	6.8
1963[e]	155.7		

Source: Fruit and Vegetable Division, A.M.S., U.S.D.A.

in 1963 totaled 24 million pounds representing 6.8 percent of total production. Almost 6 percent of the total production was purchased for these programs in 1959, but because of the small crop in 1959 (relative to 1962) the physical volume was only 15.8 million pounds.

Other purchase programs of the federal government include those by the Veteran's Administration and the Armed Forces as shown in Table 11. It must be assumed that Veteran's Administration purchases and, to a lesser extent, Armed Forces purchases are made outside of price and surplus quantity considerations unlike Section 6 and Section 32 purchases. Yet in terms of the total quantities available to be marketed, the

TABLE 11.--Tart cherries: Purchases by federal agencies, 1950-1962

Year	Armed Forces	Veterans Administration	Sections 6 and 32	Total Federal Purchases Total	% of Total Prod.
	- - - 1000 lbs. raw product equiv. - - -				
1950	32,946	350	13,400	37,696	12.1
1951	63,240	350	8,500	72,090	23.0
1952	17,620	350	2,500	20,470	8.7
1953	9,108	350		9,458	3.6
1954	5,434	350		5,784	2.7
1955	12,318	350	10,100	22,768	7.6
1956	8,224	350		8,574	4.3
1957	12,690	425	8,900	22,015	7.5
1958	10,969	223		11,192	5.4
1959	10,397	350	15,800	26,547	9.6
1960	5,018	350	7,000	12,368	5.3
1961	11,761	350	11,700	23,811	7.2
1962	9,500	428	24,000	33,928	9.6

Source: Fruit and Vegetable Division, A.M.S., U.S.D.A.

former two groups provide a major outlet for tart cherries. It would appear desirable for industry groups to explore with the Armed Forces purchasers the possibilities for coordinating the bulk of purchases to coincide with times of excess marketable supplies.

More importantly in the case of Section 6 and Section 32 purchases, organizations in the tart cherry industry can play an important role in Federal purchase programs by making program administrators aware of the surplus situations when they occur. This function is essential since Section 6 funds are allotted partially on the basis of requirements for School Lunch Programs and partially on the basis of supply and price situations as they occur in the various commodity groups. The history of purchases shown in Table 10 bears out this

conclusion. The influence that industry organizations can have on federal purchase programs helps to justify their existence although it appears that the value of activities of this type are often overlooked by the membership and not always stressed by its leaders.

CHAPTER V

MARKETING PROGRAMS DESIGNED TO INFLUENCE TART CHERRY SUPPLIES

Market Information Sources and Needs

Adequate information made available to the industry should permit its members to better assess the situation and prospects for economic gain. Information on crop size, expected prices and expected movement at various prices should permit processors to make better decisions on product mix, opening prices and whether to sell at pack time or hold stocks in anticipation of higher prices later in the marketing season.

At the producer level, adequate information on tart cherry prices in absolute terms or tart cherry prices relative to alternative crop prices should lead to more realistic decisions on whether to expand or contract acreage of tart cherries. If tart cherry price expectations are unfavorable, potential growers might be discouraged from setting out new trees. On the other hand if price expectations were favorable the opposite result might be forthcoming.

This section will provide a summary of types and sources of information having a bearing on the economic

aspects of the tart cherry industry. In addition, the weaknesses in existing data will be discussed and suggestions made for improving this situation.

The main sources of periodic statistics on tart cherry production, utilization, pack shipments, stocks, prices, federal purchases and other relevant categories are tabulated in reference form in Table 12.[1]

While these data are tabulated and published, the relatively large number of sources makes their general distribution to industry members fairly difficult. For the past seven years, Michigan State University, Department of Agricultural Economics has attempted to make these data more available by summarizing them and publishing an annual mimeographed report analyzing some of the relevant trends in prices and movement.

More recently the Horticultural Crops Group of the Economic Research Service, U. S. Department of Agriculture in cooperation with the Michigan Agricultural Experiment Station, has undertaken a comprehensive research program to provide the industry with better economic information. Several studies including this one are currently underway or nearing completion. An Interregional Competition study is being conducted to determine comparative advantages in the production and processing of tart cherries. A report on costs of production and harvesting in each of the four major

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[1]This table lists only periodic sources. Related studies and reports are listed in the bibliography.

TABLE 12.--Sources and types of tart cherry periodic data available in 1964.

Tart Cherry Data, Type and Breakdown	Source (see footnotes at end of table)
Tree Numbers	
Bearing and non bearing 1940, 1950, 1954 and 1959 by 11 producing states	Agricultural Census, Bureau of Census, U. S. Dept. of Commerce and 1
Production of Fruit	
Tons produced in each of 11 states, annual data 1945-1963	1, 2, 8
Utilization of Fruit	
Quantities canned, frozen and brined 5 Great Lakes producing states and 6 Western states combined, 1945-63	1, 2
Processed Pack	
Canned pack, by states	1, 2, 3, 6
Frozen pack, annual by states and regions	1, 2, 3, 4, 5
Brined pack, by states	1, 2
Canned pie filling annual pack report, U. S.	3
Shipments, by States	
Canned shipments by months	3, 8
Frozen cold storage holdings differences	7, 8
Stocks on Hand	3, 8
Canned, monthly report by states	3, 8
Frozen, monthly report total U. S.	7, 8
Prices	
Canned by leading states	2, The Canning Trade magazine, N. Y. Journal of Commerce
Frozen by leading states	2, 5
Federal Purchases	1, 5

TABLE 12.--Continued

Tart Cherry Data, Type and Breakdown	Source (see footnotes at end of table)
Exports	USDA Foreign Ag. Serv. Great Lakes Cherry Producers Marketing Cooperative Grand Rapids, Mich.

[1]Fruit and Vegetable Division, Agricultural Marketing Service, U. S. Department of Agriculture, Washington, D. C., Unpublished Work Sheets, 1964.

[2]Department of Agricultural Economics, Michigan State University, East Lansing, Michigan, report published annually in June.

[3]National Canners Association periodic reports.

[4]National Association of Frozen Food Packers reports.

[5]Quick Frozen Foods, monthly periodical.

[6]The Almanac of Canning Preserving Industries.

[7]United States Department of Agriculture, Cold Storage Report.

[8]Weekly Digest, Washington, D. C.

Great Lakes producing states is in manuscript form.[1]

A Master's thesis was recently completed at Michigan State University which traces the marketing channels and flows of tart cherry products for the U. S. as a whole.[2]

A similar study for New York cherries was just completed

[1]Ohio data are excluded because of the relative small size of their production area.

[2]Nye, op. cit.

by the Department of Agricultural Economics at Cornell University under the supervision of Dr. Max Brunk.

Two important studies were recently completed at the Michigan station by C. C. Dennis. The first is a study titled, Long-Run Equilibrium in Tart Cherry Production, which attempts to measure the impact of present prices of tart cherries on future production and price.[1] The second study by Dennis, titled, Supply Management-Potential Effect on Tart Cherry Producer Incomes, explores the probable short and long run effects of supply management on returns to producers of tart cherries.[2]

Other relevant studies have been made and are reported in the bibliography since they are too numerous to itemize in this section.

Although the list of data in Table 12 appears fairly complete, refinements and additions are necessary in almost every category. Very little data are available on pack and prices of pie filling, a product rapidly growing in importance. Exports are reported on the basis of all cherries and should be separated into sweet and sour cherry exports. Better data on distribution points would permit researchers to refine information on the structure of the remanufacturing industries such as pie bakers and preserve manufacturers.

The processing industry should consider improving their

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[1]Dennis, op. cit.

[2]C. C. Dennis, "Supply Management--Potential Effect on Tart Cherry Producer Incomes," Journal of Farm Economics, Vol. XLV, No. 4, November, 1963.

price and market reporting procedures to permit a wider range of studies dealing with intra-seasonal aspects of competition pricing and promotion. Growers should consider a similar program to provide information on tree removal, mechanical harvesting and other aspects of their business affecting the competitive posture of the industry. Ideally more data should be available on the final consumption of tart cherries including the effects of price, alternative displays and other merchandising techniques on movement of tart cherry products.

Finally a much improved system of data communication between growers, processors and distributors would greatly facilitate pricing efficiency and help to market the crop which is traditionally highly variable from year-to-year.

Supply Control Programs

Supply control programs have been attempted on many agricultural commodities over the years and are still fairly popular in some. Examples are found today in Cling peaches in California, grapes in Pennsylvania, cranberries, and raisins.

The basic premise under which supply control programs are undertaken is that reduced or managed supplies can be moved to market at prices and net revenues above those which would exist under free and unrestricted production and marketing. While this concept has not been readily accepted in this country, particularly among agricultural industries, it is of sufficient importance to be analyzed for its potential

impact on prices and revenues in the tart cherry industry.[1]

Several possible types of supply control programs are of interest. These include quality control, contractual arrangements between producers and processors to control quantities processed and surplus disposal programs. For purposes of this analysis, supply control programs will be differentiated from supply management programs, the latter being designed to handle forthcoming supplies in the best possible manner but not attempting to restrict their entry on the market.

The effectiveness of a supply control program can be measured by comparing prices and net revenues expected at different levels of output. Assuming that season average price is established at the intersection of the supply and demand curve, the demand curves developed in Chapter III can be used to compare prices and revenues. In general, a reduction in supplies reaching the market will always be associated with an increased unit price. But a reduction in supply over the elastic portion of the demand curve will be associated with reduced net revenue since total revenue is decreased and costs of the program increase average total costs. Thus it is possible to initially conclude that in order for a supply control program to effectively increase net revenue, it can only be employed when demand in the

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[1]It is an interesting sidelight to compare the Cartels which control sources of supply, the lack of anti-trust legislation and freedom to merge distribution facilities and organizations in many European countries with the anti-trust legislation, the Federal Trade Commission and the Interstate Commerce Committee activities aimed at maintaining competition in the markets of the United States.

relevant range of control is inelastic with respect to price. At least two other aspects must be considered along with price and revenue effects of a supply control program. These are: the long run performance of a program including its effect on prices and supplies and its short run effects on demand for substitute commodities.

Quality control.--A quality control program for tart cherries could be initiated most effectively by adopting more stringent grading procedures at the processor level. This is a more feasible program now than ever before because of the availability of high-speed electronic sorting machines. The potential effects of a quality control program are two-fold. First, it could upgrade and standardize the quality of tart cherries and hopefully improve consumer acceptance. Secondly, it could reduce available supplies reaching the market particularly in years when traditional sorting procedures on unusually large crops would lead to depressed prices (when in the inelastic range of the demand curve or when crop size was significantly greater than 308 million pounds).

The demand relation at the producer level discussed in Chapter 3 can be used to measure the effect of supply reduction through a quality control program. Point A in Figure 6 defines the point on the demand line where the price elasticity of demand is unitary or where total revenue is maximized. This point falls at 1.62 pounds per capita. In years when available total supplies are smaller than 1.62 pounds (308 million pounds equivalent for a population of

190 million), a quality control program that would keep part of the crop off the market would reduce total supply and net revenue and thus would appear to be unacceptable.

On the other hand, if total supply were greater than 1.62 pounds per capita, a movement toward point A through a quality control program would increase producers net revenue providing that the program costs were less than the increase in total revenue. The question is what would be the size of income effect at the producer level of a supply reduction program through upgraded quality?[1] In order to provide an answer to this question Table 13 relates total revenue to total supply following the price-quantity relationship estimated in Chapter 3 and shown in Figure 6.

Column 1 in Table 13 shows prices associated with per capita total supply of tart cherries in Column 2. Data in Column 2 are converted to total quantities in thousands of pounds to obtain Column 3. Column 4 shows the associated total revenue computed by multiplying per unit price by pounds of adjusted total supply. By computing total supplies from a base of 167 million population (the average of the 1947-63 period) instead of a more recent base, the total revenue figures more nearly approximate what would actually be expected from sales of the production component of total supply (total

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[1]Total revenue at the processor and retail levels increases as per capita total supply increases indicating that the estimated demand functions these levels are elastic over the entire range of the data. Only the demand relation at the producer level has both an elastic and an inelastic segment.

TABLE 13.--Tart cherries: Grower prices, total revenue and estimated total supply, United States[1/]

Grower Price (¢/lb.)	Total Supply		Total Revenue	
	Per Capita (lbs.)	Total[2/] (1000 lbs.)	Estimated (1000 $)	Change (1000 $)
10.18	1.1	183.7	18,701	---
9.71	1.2	200.4	19,459	758
9.24	1.3	217.1	20,060	601
8.77	1.4	233.8	20,504	444
8.29	1.5	250.5	20,766	262
7.82	1.6	267.2	20,895	129
7.35	1.7	283.9	20,867	-28
6.87	1.8	300.6	20,651	-216
6.40	1.9	317.3	20,307	-344
5.93	2.0	334.0	19,806	-501
5.45	2.1	350.7	19,113	-693

[1/] Follows the estimated demand relation in Figure 6, Chapter 3.

[2/] Adjusted to production portion of total supply by assuming population at 167 million, the average of the 1947-63 period.

supply equals production plus carryin). Thus, insofar as the estimated demand line actually describes the price-quantity relationship, the total revenue column represents revenues forthcoming from the production of total supply.

Column 5 of Table 13 shows the change in total revenue associated with a movement in quantity produced. For example, data in Column 5 show that an additional total grower revenue of 758,000 dollars would be forthcoming by moving from the first row (183.7 m pounds) to the second row (200.4 million pounds); or that a decrease in total revenue of 693,000 dollars would be forthcoming by producing an additional quantity of

16.7 million pounds (from 334.0 m pounds to 350.7 m pounds).

Table 13 can thus be used to estimate the gross income effect of a quality control or supply control program. Net revenue can be approximated by subtracting program costs from gross revenue increases. Assume that production estimates indicated a crop of 300 million pounds of tart cherries. According to Table 13, this crop would be expected to bring a total revenue of 20,651,000 dollars to growers. If a quality control program were in effect and designed to remove five and one-half percent of the crop (16.7 million pounds), total revenue as shown in column 5 would be increased by 216,000 dollars ($20,867,000 minus $20,651,000).[1]

There would be problems associated with an improved quality control program. First, it would only be economically feasible for fairly large crops, 300 million pounds or more, since total revenue to growers (and processors) would be reduced if supplies were reduced when crop size was estimated at 270 million pounds or less. This would mean that product quality would be upgraded only in years of a large crop. Thus the range of quality existing between years would be increased. The effect of increased variability of quality on consumers' willingness to purchase tart cherry products has not been measured. It could, however, tend to result in decreased tart cherry demand and shifts to substitute products. Secondly,

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[1]It must be assumed that the quality control program is over and above that which normally exists in processing. Currently it is estimated that between 1 and 3 percent of the cherries are sorted out in the processing operation.

there is the problem of implementing such a program. Not all plants would be willing to go along with this program. Plants handling relatively small quantities of tart cherries may find it difficult to justify purchasing or renting high-speed electronic sorting machines. And it is economically and physically impractical to remove up to 8 percent of the incoming tart cherries on a hand sorting basis.

Finally a quality control program to reduce supplies would be difficult to administer particularly in a year when a large crop is predicted for the U. S. as a whole but where individual producing areas are not in a surplus situation. Producers and processors in areas where the tart cherry crop was normal or less than normal would, under the circumstances be extremely reluctant to participate in a program to reduce supplies through more stringent grading.

Contracting for supplies (vertical coordination).-- Another program that will be briefly discussed for its potential supply control features is the use of the contractual arrangement between individual producers and processors binding both parties to maximum tonnage for delivery and other terms of trade.

Processors are generally reluctant to refuse to handle incoming tonnage of tart cherries from their growers mainly because of the fear that they will not be able to obtain other products in that year and that the growers will shift allegiance to other competing processors in the following year when the tart cherry crop will likely be short. This frequently leads to an over-pack by an individual processor

which may strain his financial structure and necessitate a partial "sell-out" at depressed prices which may help to precipitate a general depreciation of the tart cherry market.

In 1962, it is estimated that slightly less than 20 million pounds of tart cherries were not utilized but only part of this abandonment stemmed from the reluctance of processors to accept the product. Labor shortage and the relatively low grower price were also contributing factors. Yet this abandonment was relatively small given the record crop and carryover stocks from the previous year.

There is little doubt that a supply control program in 1962 would have increased grower total revenue. Growers received a total income of 16.4 million dollars in 1962 for the record high yield following a total gross revenue of 27.6 million dollars in 1961. If, however, producers and processors had contracted for specified tonnages prior to the harvest the abandonment and total grower revenue could have been larger as estimated by Table 13.

Again the problems associated with such a program are many and varied, yet there is a precedent for such arrangements particularly in vegetable production and processing and in grapes in the case of the Welch's organization. In any event, the possibilities for supply control (particularly in large crop years) through improved contractual arrangements should be further investigated.

Surplus disposal (orchard destruction).--A third supply control program that offers considerable promise is

that of surplus disposal by orchard destruction of part of the crop. This program has been investigated by Dennis.[1] He considered both the short and long run effects of orchard destruction and concluded that this alternative has considerable advantage over a surplus set-aside program since the farmer not only increases gross revenue but also "saves" harvesting costs which are roughly half of the total cost of producing tart cherries. The long run effects were not clear since increased short run returns can adversely affect long run returns through their potential long-run supply response. Thus the more successful a supply control program is in the short run the more need there is for an expanded program to handle increased future stocks.

An extension of Dennis' result is that a supply control program in years of excess production plus a rising demand due to population increases could lead to stabilization and growth in quantity marketed and prices received.[2]

Supply Management Programs

For purposes of this discussion, supply management programs are defined as those which attempt to manage existing supplies to increase industry net revenue but do not attempt to limit or reduce quantities of tart cherries available for processing and marketing.

Supply management alternatives include attempts to regulate the flow of tart cherries in the time, form, place

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[1] Ibid., pp. 772-773.

[2] Ibid., pp. 776-777.

and possession dimensions of the market. Specific programs to be discussed include: 1) Surplus set-aside; 2) Market diversion or price discrimination and; 3) Expanded grower cooperative processing.

Surplus set-aside (pooling).--A Federal marketing order program to set aside certain quantities or processed tart cherry products when their entry onto the market would depress prices and incomes has been under study by a tart cherry industry committee appointed by the National Red Cherry Council. This committee carried their activities to the point of drawing up a proposed federal marketing order that provided for grower financing of processing and storage through a marketing order which makes grower participation mandatory.

The major part of the study committee's effort was devoted to the mechanics of such a program. But a more interesting aspect of this program is its economic feasibility. Since stocks from a set-aside pool may be fed into the marketing channels at appropriate times, the economic gain from this program can come from two potential sources. The first source of gain comes when excessively large stocks are removed from normal marketing channels and placed into the set-aside pool and prices and total revenues are thereby increased (assuming that this action was taken at the appropriate time). In this sense, the effect of pooling is similar to other supply control programs. The second source of gain arises because the pooled stocks are available to be fed into the market at times when their entry would depress prices

proportionately less than the quantity placed on the market and would thereby increase total revenue to growers. In the meantime, however, these stocks are being stored in fairly expensive forms so that the cost of this program is high relative to those discussed previously. Storage, interest and insurance costs average about one quarter cent per month per pound. Thus it would cost about 600,000 dollars to store 20 million pounds for one year.

Analysis of the potential grower price and gross income effects can again be made by referring to Table 13. Assume that the tart cherry crop available for processing is 317.3 million pounds. A surplus set-aside of 16.7 million pounds of raw product equivalent would yield an additional 344,000 dollars of total revenue to growers according to estimates in Table 13. Now assume that in the following year a tart cherry crop of 233.8 million pounds is forthcoming. These would yield an estimated price of 8.77 cents per pound and a total revenue of 20,504,000 dollars. But it would then be a favorable time to enter the set-aside into the market. And while these stocks would be associated with a lower price, total revenue for the crop plus set-aside stocks would equal an estimated 20,766,000 dollars or an increase of 262,000 dollars. Thus the combined income effect of the surplus set-aside operation would be estimated at 344,000 plus 262,000 dollars for atotal of 606,000 dollars.

In order to determine the net income effect, the costs of storage insurance, interest and handling must be subtracted. As shown above, these costs total one-fourth

cents per pound per month or a total of 3 cents per pound for a year. Thus the 16.7 million pounds set aside would cost a total of 501,000 dollars for storage and handling leaving a net income effect of something over 100,000 dollars. This analysis assumes that processing fees to growers owning the set aside equaled actual processing costs and that they were just covered by the sale of the product at wholesale.

Similar comparisons of costs and returns can be made for other levels of production from data in Table 13 and by using the storage costs estimates presented above. In addition, the income effect of setting aside larger or smaller quantities than the 16.7 million pound lots shown by intervals in Table 13 can be estimated by interpolation between total revenue figures.[1]

The net revenue effect of a set-aside program would be small except in years of excessively large crops because of the costs of storaging and handling. This program may be fairly acceptable to the industry, however, since it averts (perhaps only postpones) the need for product destruction. Stocks of processed tart cherries are not preservable for an indefinite period. This means that year-old stocks would have to be moved out regardless of the supply conditions. If a surplus set-aside could not be realistically put back into the marketing channels a year after it was set aside,

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[1]Care must be exercised, however, since total revenue is not a linear function of total supply or production.

it would eventually have to be either destroyed or moved onto the market and replaced with stocks from the current pack. These alternatives are both costly.

There is the additional possibility that once stocks were set-aside and out of the marketing stream the administrative body (assuming a federal marketing order) would find it difficult to release the product onto the market. This situation might occur, for example, when a large crop was followed by one of average size. In this eventuality, the surplus set-aside would have to be destroyed or, if possible, sold into a non-competitive outlet such as the foreign market or to a federal agency for welfare or school lunch purposes. The possibility of destroying processed products may be even more objectionable than that of abandoning part of the crop in the orchard.

Administration of a surplus set aside would be difficult under any circumstances. Decisions would have to be made involving quantities to set aside, timing of pool release or destruction, type of product to store, and how to handle regional variations in production and set aside quotas. It seems unlikely that this program could be accomplished without the authority of a federal marketing order. And while this analysis does not investigate the federal marketing order structure for its appropriateness for a surplus set-aside program, it appears at this writing that the voting members of the industry are not prepared to embrace a non-voluntary program of this type.

Market diversion (price discrimination).--Market diversion, or price discrimination, as it is commonly named, is the practice of selling a single commodity to different buyers at different prices for a total revenue greater than that which would exist under a single price system of selling.[1]

A requirement that must be met for market diversion to be effective in the tart cherry industry is that there is agreement between producers (sellers) to equally share the costs and returns from market diversion. For under ordinary competitive conditions the demand curves of individual producers (sellers) will be very elastic with respect to price and market diversion and price discrimination will not lead to great differences in prices charged by one producer (seller) to different buyers (processors in the case of tart cherries). But a producers' group which controls large quantities of tart cherries could effectively charge variable prices. Another requirement for effective price discrimination is that the commodity diverted to the low priced market cannot be transferred into the higher priced market.

If these conditions can be effectively brought about, it is possible to show that total revenue to producers (sellers) can be increased by diverting sales from the markets with a relatively inelastic demand to markets with a relatively elastic demand or from markets where the marginal revenue from the sale of an additional unit of commodity is relatively low into markets where the marginal revenue from

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[1]Robinson, op. cit., p. 179.

the sale of another unit of a commodity is relatively high.[1]

In the case of tart cherries, the initial requirement of seller agreement is already met to a large extent because of the existence of the grower bargaining cooperative (Great Lakes Producers Marketing Cooperative, Inc.) which has about 2400 members in five states and controls the selling of slightly more than 50 percent of the annual production. The requirement of market separation can also be met quite easily since the cherries are immediately transformed into various processed products each of which has a separate market.

If the concept of market diversion or price discrimination were to be applied to the tart cherry industry, two problems would immediately confront the producers (sellers). First how should the total processor market which is now able to purchase tart cherries for any purpose at a single price be divided? And secondly, once divided, what prices would be appropriate in the divided market? These questions cannot be answered in a definitive manner without considerable further study, but some obvious generalizations can be drawn from the data to provide insights into the nature of the answers.

The aggregate demand for tart cherries can be decomposed into two parts according to the relative elasticities of demand. The demands for products such as canned No. 10 water packed and frozen 30 pound tins of tart cherries probably

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[1] Thus effective price discrimination can also occur when product is moved from an elastic market to a more elastic market.

are in the low elasticity category. The demand for canned tart cherries in number 303 cans and number 10 cans, tart cherry pie filling and the demand for cherries for juicing are probably in the high elasticity category. Assuming this to be true, the decision rule for increasing sellers' total revenue is to divert tart cherries from the institutional markets for no. 10's and 30 pound tins into the canned and juice market having the more elastic demand. It would be profitable to continue this diversion until the additional total revenue from the sale of an additional unit of commodity in the high elasticity market (retail sized canned and juice market) is equal to the loss of total revenue from diverting an additional unit of commodity from the low elasticity market (canned no. 10 and 30 pound frozen tins of cherries).[1]

Total revenue is maximized when the additional total revenue forthcoming from the sale of an additional unit in each market is equal to the additional total cost of producing another unit of commodity in the entire market.

The concept of market diversion has, however, a more straightforward application to the tart cherry industry and can be related to programs for new product development discussed in the previous chapter. In a large crop year when the intersection of the supply and demand curves falls in the

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[1]Which is the same as saying sellers should adjust sales in such a way that the additional total revenue obtained from selling an additional unit of the commodity in one market is the same as in the other market. Joan Robinson, Ibid., p. 181.

inelastic portion of the aggregate demand curve, a form of market diversion or price discrimination could be practiced by making quantities of tart cherries available at a lower price to tart cherry juice processors and others interested in developing new products that are now not feasible to develop at existing tart cherry prices. New dehydration techniques would undoubtedly be used on larger quantities of tart cherries providing they could be made available at lower prices. This would permit tart cherries to compete in the consumer market with substitute products such as raisins, dried apricots, dried prunes and dried peaches.

Again Table 13 can be utilized to estimate the economic feasibility of this proposal. Assume a crop of 317.3 million pounds. Diversion of 16.7 million pounds is associated with an increase of 344,000 dollars in total grower revenue. Diversion of this quantity at a much reduced price would be feasible and practical since its availability for usual processing would only reduce expected total revenue. Its diversion to a dehydration plant at even one-cent per pound would mean an additional total revenue of 167,000 dollars for a net total revenue effect of 167,000 plus 344,000 dollars of 511,000 dollars. The merit of such a program is that it would permit development of a new product which cannot currently compete on a price basis with other similar products.

Assuming that five pounds of tart cherries can be converted to one pound of dehydrated cherries, the cost of

raw product in a pound of dehydrated tart cherries could be reduced from 30 cents, assuming they now sell at six cents per pound, to a mere 5 cents assuming they were diverted to this use at one cent per pound. Since this entire decrease in raw product cost could be reflected in the retail selling price, the prospects for the increase in quantity demanded appear quite favorable. A similar argument could be made for diverting part of large crops to juice plants.

Another possible diversion activity would be the expansion of foreign sales through a privately financed export subsidy approach. Briefly this program would work similar to that discussed above under diversion to new products. The foreign diversion program, however, would be an attempt to gain new markets for existing products. The potential net economic gains could be estimated from data in Table 13 and by determining the potential costs of increasing the demand in foreign markets. Studies of the price elasticity of demand in foreign countries are necessary in order to adequately determine their potential.

CHAPTER VI

PROGRAMS AFFECTING MARKETING COSTS

Given the demand relationship existing at the retail level, it is theoretically possible to increase the price and revenue positions of processors and producers by reducing the costs of marketing. In essence market cost reductions narrow the gaps between the demand relations at retail and the derived demand at the processor or producer levels, since in the long run margins are expected to approach marketing costs.

Two programs designed to reduce marketing costs in the tart cherry industry are discussed in this chapter. First price bargaining between producers and processors and second, a specific method of reducing transportation costs between processors of frozen tart cherries and institutional buyers.

Price Bargaining

Price bargaining between producers and processors has been conducted in the Great Lakes producing area since 1958. As stated above, approximately 2400 growers in Michigan, New York, Pennsylvania, Wisconsin and Ohio belong to the Great Lakes Cherry Producers Marketing Cooperative, Inc., which was originally set up for price bargaining purposes.

This organization represents from 40 to 60 percent of the annual production of tart cherries depending on the distribution of the crop in the Great Lakes region since their membership is primarily in Michigan.

The effect price bargaining has on marketing costs and margins is two-fold. First the price between regions in a given year has been fairly well stabilized which has tended to reduce the possibilities for price competition between processors in different states and regions. In a sense, this inter-year price stability reduces uncertainty on the part of processors and should result in lower safety margins and higher prices to growers. In addition, some of the costs of obtaining tart cherries by processors through the use of fieldmen are reduced through the normal operations of the bargaining cooperative. This reduces the number of individual negotiations and buyer-seller transactions leading to cost savings.

Secondly, price bargaining by producers and processors has led to an improved awareness of the underlying supply and demand factors determining market prices making price discovery more efficient and subject to less costly errors. Evidence of this is provided by the new concept in bargaining which was used on an experimental basis in 1963.

In 1963, the producers' cooperative offered to sell their members' tart cherries on the basis of a schedule of prices to be finally determined after harvest rather than at one specific bargained price determined before harvest as

had been done in previous years. The difficulties encountered in pre-harvest estimates of production lends credence to the "price-quantity schedule" concept attempted in 1963. Crop estimates made in mid-June have varied from actual post harvest tonnage by as much as 25 percent. A bargained price based on an erroneous pre-harvest crop estimate can have devastating effects on either producers or processors depending upon which way the error falls. In 1963 an arrangement was negotiated whereby processors paid growers a base price per pound upon delivery and the difference between the base price and the schedule price after all the crop was harvested and final production determined.

This new concept in price schedule bargaining is not without complications. It necessitates additional bookkeeping by processors and it is opposed by many of them who sell the bulk of their pack at pack time. This group of packers must price the product to their buyers without knowing exactly what the raw product cost will be. The bargaining cooperative must determine an entire price-quantity schedule along which they are willing to sell tart cherries rather than deciding on a specific asking price.

Price bargaining between producers and processors increases the importance and significance of good data on all economic aspects of the tart cherry industry and makes analyses of these data essential. The demand studies at Michigan State University and the tabulation and reporting of economic information is used in the bargaining process. They are also used by buyers and brokers to help them to assess

the future course of prices and movements of tart cherry products.

Large buyers of tart cherry products such as retail chains and pie manufacturers are emphasizing separation of their purchasing function into two parts. The first and perhaps most important part of the purchase involves decisions on when, where, and how to buy to obtain the maximum economic advantage. The second part of the purchasing function involves the actual transaction, or the logistics of obtaining the product, moving it into the proper warehouse facilities and making payment. The economic decisions are thus separated from the physical decisions and expertise can be employed in both leading to specialization and economies of scale. Competent market analysis, purchasing specialists and econometricians are being employed to help make economic decision. Questions are raised by buyers such as, "should we purchase the bulk of our required supplies at pack time, or should we buy on a 'hand-to-mouth' basis in anticipation of a lower price in the future?" The answer to this question involves a knowledge of the demand relation and supply situation as well as a knowledge of costs of storage handling and transportation and well formulated predictions of price movements throughout the marketing season.

The fact that buyers are tending to rely more heavily on market demand and price analyses in their everyday decisions should mean increased purchasing efficiency and reduced margins in the long run. But, in the short run, the buyer

that does a better job of procurement tends to realize a profit advantage over competitors. And his purchasing economies are not immediately reflected in lower prices to consumers or higher prices to growers or processors. The ultimate outcome of these changes in terms of the relative benefits to consumers, processors and producers depends partly on how adept these groups are in bargaining for the available benefits. Consumers "bargain" for reduced prices by withholding from purchases or by switching to the purchase of substitute products. Processors must bargain more vigorously for the benefits of cost reducing innovations in purchasing. Producers, in turn, have the opportunity of bargaining for higher prices through their joint efforts since as individuals they cannot influence prices which they will receive.

These dynamic changes in technology, institutional structure and organization of inputs leading to cost reductions make the job of managing a firm or organization in the industry much more complex over time. Extensions of traditional modes of behavior are no longer relevant decision criteria. Traditional rules-of-thumb in the operations of the industry require reevaluation and adjustment. And new action programs with respect to both public and private policy are required.

To be more specific, there is a need for challenging the economic logic of basing decisions about the future on traditional demand relationships at the derived demand levels. In the dynamic context, there is no logical reason for assuming that the derived demand relation estimated by statistical

techniques at the processor or producer level is the "correct" relationship. Just because it provides a summarization of what has existed in the past does not necessarily justify the conclusion that this is what ought to occur in the future. It does, however, permit a probability statement about what "will" occur in the future in the absence of any concerted effort on the part of buyers and sellers to change the buying, selling and pricing rules.

But perhaps a discussion of these needs and complications are premature. The basic concept of price bargaining through group action has not been and is not now widely accepted social behavior even in the tart cherry industry. The reluctance to engage in such activity stems from the independent nature of many producers and processors, and the traditional business ethics bordering on a paternal relationship which has existed between them. These, beliefs and values are showing signs of change. Where the solution will crystallize remains to be seen.

Other Cost Reducing Programs

Price bargaining is concerned with efficiency in buying and selling or in the exchange function and in strengthening the bargaining position of a group of sellers. But buying and selling are only two marketing activities where cost reduction programs are possible. Kohls lists two other areas: The physical function which includes storage and transportation and the facilitating function which includes standardization, financing, risk-bearing and market

information.[1]

There is no doubt that possibilities exist for reducing costs in all other categories. In a decision making framework, however, the answers or solutions rapidly become more complicated when we attach the economic, social and institutional constraints to them. It is not appropriate to suggest that all cost reductions are desirable. Their desirability hinges on their social, economic and institutional feasibility.

While the feasibility of cost reducing programs depends on much more complex analysis and evaluation, it is possible to suggest changes in marketing techniques which lead toward minimization of costs in an absolute sense. This procedure does not imply that these changes are socially, economically or institutionally feasible, but it does permit a preliminary evaluation of the benefits accruing to the industry for undertaking such a cost reducing program. An example is provided in the following section.

Transportation cost reduction.--Tart cherries are transported from the 11 producing states to every other state in the union in the process of distribution. Given information on sources of tart cherry production and location of tart cherry consumption, it is possible to obtain a least cost distribution solution by applying data to the standard transportation model of the linear programming framework. This procedure has been applied to the production and distribution

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[1]R. L. Kohls, Marketing of Agricultural Products (New York: The Macmillan Co., 1955), p. 18.

of frozen tart cherries in 30 pound tins for the year 1961. The procedure and solution are presented in this section.

Data on production of frozen 30 pound frozen tins of tart cherries were obtained for each of the 11 producing states.[1] Production was converted to gross pounds of frozen product shipped by adding the weight of the cans at three pounds each to the net weight packed.

Data on sales value in each state for 1961 were obtained from the Quick Frozen Foods publication.[2] These data were converted to sales volume in each state by dividing value by price per pound including transportation and brokerage fees.

Freight rates per hundred weight of frozen tart cherries shipped by rail in car lot equivalents were then obtained.[3]

The data on sources and destinations of frozen tart cherries were then combined with freight rate data in the transportation model to provide a solution to the problem of how the tart cherries should be moved to the purchasing states to minimize total costs of transportation.

Table 14 shows the solution in terms of source, destination and pounds of frozen tart cherries. The solution

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[1]Oldenstadt, Economic Relationships in Red Tart Cherry Marketing, op. cit., p. 28.

[2]Quick Frozen Foods, magazine, October 1962.

[3]Freight rates were obtained from Smith Greig, Associate Professor, Department of Agricultural Economics, Michigan State University, who also ran the programming problem through computing facilities.

involves only those tart cherries that are shipped out of the producing states, which is the same as assuming that sales within the producing states are shipped without a transportation charge.

TABLE 14.--Sources and destinations of frozen tart cherry sales volume to institutional buyers on a minimum transportation cost basis, 1961.

Source	Destination	Pounds Shipped
Michigan	California	24,734,000
	Illinois	12,430,400
	Ohio	10,586,700
	Pennsylvania	8,696,800
	Indiana	5,776,600
	Louisiana	3,658,700
	Florida	3,228,800
	Virginia 1/	2,943,436
	North Carolina	2,798,200
	Oklahoma	2,688,900
	Georgia	2,425,000
	Maryland 1/	2,308,400
	Tennessee	2,149,300
	Alabama	1,986,100
	Missouri	1,836,000
	Kentucky	1,822,900
	Arizona	1,689,400
	Washington	1,477,000
	South Carolina	1,440,800
	Texas	1,440,600
	West Virginia	1,048,700
	Kansas	937,500
	South Dakota	304,600
	Delaware	277,400
	Nevada	11,300
N ew York.	Massachusetts	9,321,000
	New Jersey	8,772,400
	Connecticut	4,690,300
	Maine	1,804,200
	Rhode Island	1,562,200
	New Hampshire	1,141,400
	Vermont	704,400
	Pennsylvania	152,000

TABLE 14.--Continued

Source	Destination	Pounds Shipped
Wisconsin.	Texas	9,671,000
	Arkansas	2,002,400
	Minnesota	1,468,100
	Mississippi	1,329,600
	Iowa	1,173,200
	New Mexico	1,141,900
	Nebraska	626,900
	North Dakota	271,200
Utah	Wyoming	408,600
	Nevada	363,700
	Montana	255,800
	Colorado	100,700
Oregon	Washington	2,293,900
Idaho.	Washington	269,600

1/ Plus one-half of Washington, D. C.

As might be expected, New York's excess production of frozen tart cherries would be shipped to the northeastern states in the minimum distribution cost solution shown in Table 14. Wisconsin's excess production would be distributed in the northern plains states with some going to several south central states and New Mexico. Utah's excess production would be distributed to neighboring states while both Oregon's and Idaho's excess production would be distributed in Washington state. The frozen tart cherries from Michigan in excess of those distributed within the state would cover all other markets.

This solution assumes (somewhat unrealistically) that

the total production of frozen tart cherries in 1961 was sold in that marketing year. This is in error by the quantity held in processors inventories at the end of the marketing year.

What the total transportation cost was in 1961 is unknown since actual data on sources and destinations of frozen tart cherry sales volume are unknown. The minimum total distribution cost in the programming solution shown is in excess of two million dollars which, as was discussed above, excludes transportation costs within the producing states.

CHAPTER VII

SUMMARY AND CONCLUSIONS

Several agricultural commodity producer groups face increasingly complex problems with respect to the marketing of their products. These problems have arisen because of the changes which have occurred in the structure and conduct of the processing, wholesaling and retailing sector, the changes in consumer demand and the changes in the production characteristics of the commodities including variability in production, price and income.

Producers of several agricultural commodities have attempted to deal with their marketing problems through joint efforts involving marketing associations and bargaining cooperatives. The dynamic nature of their problems requires a dynamic approach including a variety of marketing alternatives.

This study provides a broad framework for categorizing and analyzing alternative marketing programs available to agricultural marketing groups. The alternative marketing programs are discussed specifically in terms of their application to the tart cherry industry but they are applicable to other agricultural commodity groups.

The analytical problem approach used in this study is based on a supply and demand analysis of the tart cherry

industry. Programs are categorized into three main groups: Those affecting tart cherry demand, those affecting tart cherry supply and those affecting tart cherry marketing costs. Data on the price and revenue effects of alternative programs are presented and program cost data are provided when possible to provide estimates of the net revenue expected from each program.

This study does not consider supply and demand influencing programs as alternatives to the forces of a free and competitive market where prices and incomes are determined by the "invisible forces" of the market. Rather it takes these forces as given and goes on to suggest the possible impact on total and net revenue and prices of attempting to influence supply and demand. In essence, this study tests hypothetical solutions to the marketing problems of the tart cherry industry using income and price criteria. Increased net revenue and price stability between producing regions are the objectives assumed to be held by producers of tart cherries.

The demand for tart cherry products at retail is a function of per capita stocks on July 1, per capita production of tart cherries in July and August (the harvest season), per capita disposable income, prices of substitute products for tart cherries and other demand factors. The demand has been statistically estimated at the processor level and is used as the basis for estimating the demand relation at both the retail and producer levels.

The supply of tart cherries is a function of bearing

tree numbers and yield per bearing tree. Bearing tree numbers are influenced by previous prices and expected future prices, while yield per tree is associated with crop abandonment, age of trees, weather, technology and orchard management. Bearing tree numbers as tabulated by the Bureau of the Census reached a high of nearly 6 million trees in the United States in 1959. Michigan orchards contain about three-fifths of the total bearing trees and have shown the greatest gain of any state since 1940, Figure 8.

Non-bearing tree numbers have declined since 1950 and totaled about 1.4 million in 1959. This is roughly four times the annual requirement for replacement purposes and appears to be inadequate to meet future needs for replacement and population growth. Their decline also reflects the unfavorable price and income producing power of tart cherries relative to alternative farm enterprises.

Yield per tree has also declined to about 42 pounds in recent years after attaining an average of 50 pounds in 1953. Unfavorable weather conditions, increased disease problems and increasing average age of trees undoubtedly play a role in this decline although their relative influences cannot be determined.

The supply relation has not been statistically determined in this study. Since about 95 percent of the annual production goes for processing purposes, it is assumed that supply is perfectly inelastic at the producer level for any given year.

Market development of tart cherries is aimed at affecting the consumer's image of tart cherries and hence his demand for these products. Promotion of tart cherries is conducted by producer groups and by processors. Producers spend around 250,000 dollars annually for commodity type promotional programs. Processors spend at least that much for brand advertising and promotion. This study suggests the need to study ways of reorganizing commodity promotion to strengthen the national and the state institutions engaged in this activity.

Promotion of tart cherries should include not only media advertising and tie-in advertising with other groups, but should consider expanded efforts in the area of research on product design, package design and pricing. In addition, promotion should include merchandising assistance to the various outlets, and should provide for product distribution and public relations programs. These latter efforts can probably best be done at the state level since they require working directly with retailers, pie bakers, legislators and the public. Finally, a restudy of promotional objectives and goals should be conducted periodically by the promotional agencies and industry members.

The economic feasibility of a promotional program was studied. It was assumed that the promotional objective was to increase tart cherry demand by .1 pound per capita through expanded efforts along the lines discussed above. This would mean an increase in per capita demand of 1.6 ounces or about the quantity of cherries in one extra piece of cherry pie per

person per year in the United States. This increase in per capita demand was then added to the demand relationships at retail and the effect on total revenue and price was noted. The result showed that if this objective were met, total industry revenue should increase by one to three million dollars annually depending upon the nature of the processor-retailer marketing margin. Assuming that such a program was undertaken by producers and that retail and processors marketing margins remained the same, about one million dollars of this increase in total revenue would be available to producers. The study did not estimate the cost of reaching the promotional goal, but it did provide evidence that the return to an effective promotional program would be sizeable.

Market and product development programs also affect consumer demand for tart cherries. Market development is aimed at spreading the base of consumption by introducing products into areas not now using existing products and by intensifying consumption in areas now being served. This can usually be more effectively accomplished if it is complemented with an advertising and promotional program. Data on frozen tart cherry sales in 1961 indicate that the geographical base of sales is fairly wide but that the intensity of per capita sales varies considerably. Sales volume of frozen institutional tart cherries varied from .4 pound per capita in the West North Central region to 1.71 pounds per capita in the New England states.

Historical data on the product mix shows that the

pack and sales of frozen tart cherries and tart cherry canned pie filling has trended upward over the past several years. The pack and sales of retail sized canned tart cherries packed in water have declined while that for canned tart cherries in number 10 cans has remained fairly stable. Since most of the frozen tart cherries are packed in 30 pound tins and are used for commercial pie baking and canned pie filling in retail size cans is a more convenient item, it is concluded that consumers are tending toward tart cherries with built-in convenience. It is thus possible to conclude that the convenience aspects of new products are very important and should guide future attempts to develop new products. In addition, promotional programs should emphasize the convenience aspects of existing of products. Even the advent of canned pie filling has not been able to stem the decline in demand for retail sized canned tart cherry products. The four-year average per capita movement of retail sized canned tart cherries and canned pie filling declined from .4952 pound in 1954 to .3748 pound in 1961, Figure 5.

Government purchase and diversion programs were considered for their potential effect on prices and movement of tart cherry products. The bulk of tart cherry purchases are made for the School Lunch Program, the Armed Forces and the Veterans' Administration.

Federal purchases of tart cherries for the school lunch program reached an all-time high in 1962 when more than 24 million pounds (raw product equivalents) were purchased

under the Section 6 program. In the past 14 years, the government has purchased tart cherries in 9 years. These purchases total almost 102 million pounds representing an expenditure of almost 14 million pounds representing an expenditure of almost 14 million dollars. Heavy purchases are made when prices are low which corresponds to those periods when excess production makes these purchases very important in relieving distressed market conditions. There are two aspects of the school lunch program that are of interest to the tart cherry industry. Tart cherries served in the schools acquaint students with this product which helps to form consumption habits that may be carried on into their later lives. A more immediate effect is that this program has expanded the current use of tart cherries through expanding the number of students having access to hot lunches some of which include tart cherries.

The Veterans' Administration purchases about a half million pounds of tart cherries annually. The Armed Forces purchases considerable quantities as shown in Table 11.

During the Korean War years federal purchases by all agencies represented up to 23 per cent of total production (Table 11). In more recent years purchases by these agencies ranged between 5 and 10 per cent of annual United States total production. In terms of raw product equivalent pounds these purchases represent from 11 to 34 million pounds annually. Thus these programs are very important to the tart cherry industry.

A variety of marketing progrms designed to influence tart cherry supplies were considered. These included market

information programs, supply control programs, and supply management programs.

Economic information about the tart cherry industry should permit its members to better assess the situation and possibilities for economic gain and help to regulate supplies through affecting tree plantings, processed product mix and decisions on whether to sell or store. The sources and adequacy of economic information was discussed. It was noted that while general economic information is available, several refinements are needed. The industry should consider the establishment of a more adequate reporting procedure to make possible data refinements and to complement existing and future research. It was also suggested that an improved system of communication between producers, processors and retailers be established to facilitate pricing efficiency and to aid in marketing the highly variable crops characteristic of the tart cherry industry.

Several supply control programs were analyzed. Supply control programs were distinguished from supply management programs. The latter included programs which attempted to handle forthcoming supplies in the best possible manner but did not attempt to restrict output as did the supply control programs.

The nature of the price elasticity of demand with respect to price for tart cherry products is such that at given levels of demand supply control programs can be expected to be effective in increasing total revenue to producers only when total supplies are larger than 308 million pounds.

It should be emphasized that a producer supply control program at a level above 308 million pounds would probably reduce total revenue to processors and retailers since the points of unitary elasticity of demand with respect to prices are even greater than 308 million pounds at these levels of demand. Estimates of the expected changes in total revenue associated with changes in total supply were obtained from the estimated demand relation at the producer level, Table 13. For example, it was shown that an increase in total supplies from 334 million pounds to 350.7 million pounds was associated with a decline in total revenue of 693,000 dollars. Conversely, it can be shown that at given levels of demand a supply control program which reduces total supply from 350.7 million pounds to 334 million pounds would be associated with changes in total supply are also tabulated in Table 13. Data in this table are used throughout the discussion to evaluate price and total income effects of alternative supply control programs. Program cost estimates are provided when possible to compute net revenue effects of alternative programs.

A quality control program for tart cherries was considered as one method of controlling supplies reaching the market. High speed electronic sorters in the tart cherry processing plants makes this alternative feasible from an operational standpoint. Such a program would have the effect of upgrading product quality and would improve consumer acceptance. The fact that a program such as this would reduce total revenue to producers in short crop years would

probably make it unacceptable as a continuous program.

Vertical coordination through contractual arrangements limiting quantities of tart cherries delivered is a second potential way to control supplies. While the economic effects of this program would be sizeable in large crop years, it was concluded that the institutional and practical barriers to such a program would be great.

Surplus disposal through crop abandonment in the orchard would limit supplies reaching the market. This program has been investigated in some detail by C. C. Dennis. This program would have considerable merit since it would be associated with increased total revenue in large crop years and it would save harvesting costs which a quality control program would not do. The practical problems with administering this program would be many but probably not insurmountable providing a federal marketing order program could be obtained to regulate and enforce it.

Supply management programs are aimed at orderly marketing of available supplies. They attempt to regulate the flow of tart cherry commodities in the time, form, place and possession dimensions of the market but do not attempt to restrict output as do the supply control programs. Three such programs for the tart cherry industry are considered including surplus set-aside, market diversion or price discrimination and expanded grower cooperative processing.

Surplus set aside could be effectively accomplished only through the use of a federal marketing order. This

alternative has been studied by an industry committee. The major potential benefit of this program is that stocks could be set aside in a year of excess production and then fed back into the market in the following year when the crop is small. The usually large variation in crop size from year-to-year would permit a set-aside program to even out the flow of supplies over time. The income and price effects of stock set-aside and reintroduction was determined from the data computed in Table 13. The economic effects would be expected to vary with quantity set aside and size of total supply. The administration and regulation of a surplus pool would be difficult particularly if two large crop years occurred in subsequent years.

Market diversion or price discrimination is the practice of varying the price in different markets to take advantage of differing price elasticities of demand. Assuming the demand for water packed no. 10 and 30 pound frozen tart cherries is inelastic relative to the juice market and canned retail market, this program would divert product from the former to the latter. A higher price would thus be charged for pie filling and 30 pound tins and a lower price for canned retail tart cherries and juice. A more direct application of this market diversion would exist if in large crop years considerable quantities of tart cherries could be sold to the juice and dehydration plants at considerably reduced prices. This could increase net revenue to the industry and permit an expansion in the use of tart cherries for juice and dehydration.

About 5 pounds of tart cherries are required to obtain one pound of dehydrated cherries. If the price of the raw product could be reduced from 6 cents per pound to say three cents, the raw product cost reduction would equal 15 cents per pound making this product more competitive on a price basis with other dehydrated products. A similar result would be obtained in the case of juice. This program would be particularly desirable in a large crop year and should be seriously considered since it appears to be particularly well suited for the industry by both removing surplus production and developing a market for new tart cherry products.

Marketing cost reductions were discussed for their potential effects on revenue and prices. Price bargaining between growers and processors has the effect of reducing the cost of buying and selling tart cherries. In addition, price bargaining increases producers' ability to make prices rather than take prices as determined by the market. Benefits accruing to the industry through a change in technology or a change in the organization of resources are more available to producers if they are organized to bargain for them. Assuming fixed profits to processors and retailers, a producers bargaining group is, in essence, bargaining with consumers for the benefits of the cost reducing technology or reorganization of inputs. Under a rapidly changing state of the arts, this role can be very important to the profitability of the industry.

Price bargaining in the tart cherry industry has been

conducted between about half the growers and processors in the Great Lakes producing states since 1958. Grower prices have been set in those years by basing negotiations largely on supply and demand conditions. And while prices and incomes to growers have not increased greatly over what might be expected without bargaining, there has been a modest return to this effort. The economic logic of basing pricing decisions on traditional or historical demand relations has been questioned in this study. The traditional demand relation tells only what the probable demand or price quantity relationship is and does not imply that what existed in the past ought to exist in the future. Thus the bargaining organization is charged with the job of negotiating both the level and slope of the price-quantity relationship. A big step toward a realistic solution of the bargaining problem was made in 1963 when a price-quantity schedule was bargained rather than a specific price.

Cost reduction is technically possible in perhaps all phases of tart cherry marketing. The question is how many of these cost reductions are economically, socially and institutionally possible. No attempt was made to provide answers to these questions for all possible cost reducing programs. Only a transportation cost reduction solution was obtained.

Data on sources of production of frozen tart cherries were obtained along with data on per capita consumption of this product by states. These data were combined with freight

rate data from the producing to consuming states into the transportation model of the linear programming framework. The solution yielded information on where each producing state's excess production would be distributed and what the total minimum cost of out-state transportation would be.

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