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An Economic Analysis of Selected Problems in Processing Sour Cherries

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AN ECONOMIC ANALYSIS OF SELECTED PROBLEMS IN PROCESSING SOUR CHERRIES

by

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INTRODUCTION

Red sour cherries have been a dessert item for Americans since long before George Washington chopped down the cherry tree. In the past twenty years production of sour cherries has increased at a faster rate than population. Since 1938 population of the United States has increased approximately 43 million, a 25 percent increase, whereas sour cherry production has increased approximately 78 million pounds, a 38 percent increase. This trend is expected to continue in the future, in fact, according to a Michigan survey the production of sour cherries in relation to the population will increase more in the future (3, 5).

This increase in production can mean but one thing: in order to sell that portion of production that is not accounted for by increased population, demand for sour cherries must increase or prices decrease. If costs cannot be lowered and hence prices, or demand increased, a certain portion of growers may be forced out of production. It would be to the advantage of the industry to lower costs and/or increase demand rather than force some growers out of production.

In 1957 total production of sour cherries reached 290 million pounds. Utah produced 4.8 million pounds, or approximately 2 percent of the total. Michigan was the largest producer with 178 million pounds, or more than 60 percent of total production. Other Great Lake States produced the majority of the remainder. Utah ranked seventh in total production that year. Total farm value of Utah sour cherries was $362,400 in 1957 (5).

Even though Utah does not produce a large percentage of the total sour cherry crop, sour cherries are still important within the state.

Utah processors have been producing a "C" grade pack of sour cherries either as frozen or canned. This is due to handling the sour cherries as a one-grade product. As a result they have brought a low market price, and sour cherries from other areas have been preferred. If it is economically feasible, methods should be devised whereby the Utah sour cherry pack can be made competitive with the pack from other areas. The pack may be made more competitive if sour cherries are handled according to grade.

If the Utah sour cherry industry could improve its pack to where it is comparable to or better than the Michigan pack, and adopt new cost reducing innovations and technologies, it would have an absolute advantage as far as West Coast markets are concerned due to the freight advantage.

OBJECTIVES

1. To determine the degree of variation in the quality of sour cherries being produced in Utah.
2. To determine the difference in costs, receipts, and returns of processing sour cherries of various grades.

REVIEW OF LITERATURE

In reviewing the vast amounts of literature written on sour cherries, no research was found dealing with the objectives of this study; however, information closely related to this study is included in this review of literature.

The Great Lakes Cherry Producers Marketing Cooperative, Inc., a price bargaining cooperative, is responsible for the present pricing system in the Great Lakes area. Their method of paying the grower is as follows: a basic price is established, based upon total production and the level of the economy (4). After the basic price has been established and negotiated with the processors, the following system of payments according to grade is put into effect:

USDA Grade Percentage US No. 1 cherries	Price per pound increased or reduced by
100%	5%
99%	4%
98%	3%
97%	2%
96%	1%
95%	0%
94%	-1%
93%	-2%
92%	-3%
91%	-4%
90%	-5%
89%	-6%
88%	-7%
87%	-13%
86%	-14%
85%	-15%
84%	-16%

> . . . And so on, for each further 1% reduction in grade there shall be a corresponding 1% reduction in price. Price of cherries grading less than 88% shall be 1/2 cent per pound below price established by this Agreement.
>
> If any load of cherries so graded are graded less than 88%, then the Processor shall have the right to accept or reject said load of cherries. If Processor accepts said cherries, the price to be paid therefor shall be at the rate of 1/2 cent per pound below the price established by this Agreement, reduced further, in accordance with the foregoing schedule, by 1% for each percentage point such cherries are graded below 100%.(1, p.1)

It should be noted, however, that according to Michigan law, color, size, lug scald, and solid cherries with attached stems shall not be considered a defect (3).

> In a normal year, approximately 125,000 tons of red cherries move to fewer than 100 processors in a period of 4 to 5 weeks. In handling a perishable crop like cherries, time is a limiting factors. It has been found that, so far as quality is concerned, the most critical period is the first 4 hours after the fruit is picked. Inefficient handling during this period causes irreparable damage. The undergrade fruit that develops must be sorted out, or the pack will be of inferior quality. In either case, potential returns are reduced. (6, p. 4)

The standard method of handling cherries which is still practiced by the majority of growers and processors, including most Utah growers and processors, is as follows (7):

1. Cherries are picked in 10-quart pails, and dumped in lugs, which are then weighed to determine the quantity harvested per worker.

2. Next, often after the day's work, these lugs are loaded on trucks and hauled to a receiving station or processing plant. If delivered at the receiving station, they must be transported from truck to dock, and back to another truck, after which they are taken to the processing plant.

3. Upon arrival at the processing plant the trucks are weighed, unloaded (either by hand or fork lift), and then reweighed to determine the quantity of cherries delivered.

4. Cherries are then dumped, usually by hand, into a boot[1] from which they are conveyed to soaking tanks, where they are cooled and become firm. Often there is a 12 to 24-hour wait between the time they are picked and the time they are placed in soaking tanks. This is partly due to delay in time from picking to delivery at the processing plant, and partly due to the fact that many processors do not have enough tanks available to handle the volume delivered.

It is estimated that the processor must make available from two to three lugs for every lug of cherries that a given grower harvests in a single day (7).

In order to improve this situation, experiments have been conducted in Michigan since 1952 on hydrocooling and transportation in water. USDA engineers, Michigan Experiment Station horticulturists, producers, and processors cooperated in the research project (7).

As a result of the efforts of these researchers, hydrocooling and transportation of cherries in water has proven highly successful. During the 1959 season approximately 70 million pounds of cherries were hauled to processors, either directly from the orchard or from nearby receiving stations in large tanks of water. In hauling cherries in water it is necessary to keep the temperature of the water from 55 to 60 degrees F. to prevent scale and other breakdown. If water at this temperature is not available, or if the holding time exceeds one or two hours, ice should be added (2).

Experiments have been conducted in Michigan to test the efficiency of sorters at the processing plant. "The number of pounds of fruit sorted out by 155 sorters varied from 5½ to over 42 pounds per sorter per hour. The average pickout rate for all sorters times was about 20 pounds per hour" (8, p. 827).

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[1]The boot referred to here is a device that is filled with water to cushion the fall of sour cherries.

METHOD OF PROCEDURE

Objective I

To determine the degree of variation in quality of sour cherries produced, inspection of sour cherries delivered to processing plants was necessary. During 1959 a random sample of growers in three major sour cherry producing counties of that state (Utah, Box Elder, and Weber) were contacted to determine various production practices of Utah sour cherry growers. During this survey the author received permission to grade sour cherries of growers interviewed upon delivery to processing plants.

Permission to inspect the fruit of these growers was then obtained from managers of processing plants. Represented within these companies were both the hot pack canning and freezing methods of processing.

The author personally conducted the inspection of sour cherries in 1959. Because of the size of area covered, it was not possible to inspect every load of sour cherries each grower delivered to processing plants; however, a representative sample of each grower's fruit was taken. A separate record was kept for each sample inspected.

Due to a frost in 1959 the sour cherry crop was approximately 10 percent of normal. Because of this and the general belief that sour cherries were of inferior quality compared to other years, it was decided to continue this study in conjunction with the study on determining the difference in costs, receipts and returns of processing sour cherries of

various grades during 1960. Even though the general belief was that the quality of sour cherries produced in 1959 was below normal, the experiment still showed the variation in grade among growers.

During 1960, this experiment was continued at the Garn L. Baum Processing Plant. Each load of cherries delivered was inspected and a record of each sample inspected was kept. Sour cherry growers delivering to this processing plant were paid according to the percent U.S. No. 1 cherries they delivered. For this reason, the grade of sour cherries delivered to this processing plant may have been higher than average for the state. Some growers increased their grade several percent through better harvesting controls after they started picking. There was also a frost in 1960, but the crop was approximately 70 percent of normal. It was the general opinion that the "quality of fruit was approximately normal" in Utah County, where the experiment was conducted. Grading was conducted by a State Agricultural Inspector and by the author.

Objective II

During the summer of 1960, research was conducted to determine the difference in costs, receipts and returns of processing sour cherries of various grades. In order to accomplish this objective, it was necessary to grade sour cherries upon arrival at the processing plant, separate them according to grade and process each grade separately. The processing plant best suited for this type of study was the Garn L. Baum Processing Plant located in Provo, Utah. Garn L. Baum, the owner, expressed interest in the project and promised his cooperation.

To gain the interest and cooperation of growers delivering to the selected processing plant, as many of them as practical were interviewed before the experiment began.

At the processing plant sour cherries were inspected, weighed, and dumped into one of five cooling tanks depending upon the percent U.S. No.1 quality they graded. They were separated into three categories. The first cetegory grading 94 percent or above U.S. No. 1 quality, the second category grading 88 to 94 percent U.S. No. 1 quality, and the third category grading below 88 percent U.S. No. 1 quality. These three categories correspond quite closely with the U.S. No. 1, U.S. No. 2, and unclassified grades, respectively. The grades, weights, and tanks to which each load of cherries was assigned were recorded.

The sour cherries were soaked in cooling tanks from 1 to 30 hours, with most of them being soaked from 4 to 18 hours. After being cooled and becoming firm, the sour cherries were processed. In processing they were first released through a valve in the cooling tank, run into a water filled boot, and then elevated in order to drain off the water. The man operating the tank valve regulated the speed of processing. After draining, the sour cherries were run over one of four sorting tables where cull fruit was removed. Cull fruit was collected in 30-pound capacity cans and weighed. From sorting tables sour cherries passed into a second water filled boot from which they were elevated to a belt that carried them to one of three pitting machines. After pitting they were once again sorted and then collected in 30-pound capacity cans in which 25 pounds of cherries and 5 pounds of sugar were placed. Cans were counted by an automatic counting device and lidded. After lidding the cans of

cherries were either frozen at the processing plant or taken to a cold storage plant.

Costs of processing sour cherries of various grades were divided into four categories as follows: (a) costs due to weight losses in processing, (b) variable costs associated with processing specific tanks, (c) other variable costs, and (d) fixed costs.

Costs due to weight losses in processing included culls sorted out, pits, and foreign material. To determine these losses a record of the weight of sour cherries before processing, after processing, and the weight of cull fruit sorted out was recorded. Cull cherries were sold to a winery. For this reason weight losses due to culls sorted out were kept separate from other weight losses. Other weight losses, pits, and foreign material were determined by subtracting the weight of sour cherries after processing and the weight of culls sorted out from the weight before processing. These weights along with their percents of the total before processing were computed for each tank processed.

Variable costs associated with processing specific tanks included: cost of sour cherries, labor, cans, lids, and sugar. Labor costs were determined by a time study. The running time for each tank was recorded and man hours and category of labor calculated. Also calculated were pounds of sour cherries processed per man hour. A 30-pound capacity can with lid cost 50 cents. Sugar cost the process 9 cents per pound, or 45 cents per can.

Other variable costs included labor and electricity. Labor included dock work, maintenance and repairs on equipment, unloading and loading trucks, and other odd jobs, along with labor costs due to breakdowns and

rest periods. It was impossible to associate these labor costs with specific tanks. Electricity costs were determined on a seasonal basis.

Fixed costs included management, depreciation and repairs on buildings and machinery, taxes, and interest on investment. Management included the owner and his wife. It was estimated that one-fourth of his time and one-sixth of her time was associated with the sour cherry processing operation. A list of buildings, machinery, and their replacement value was obtained from the owner. Depreciation and repairs were computed at 10 percent of the replacement value. Taxes were determined from the preceding year. Interest on investment was computed at 5 percent of the replacement value.

All costs were determined on a per pound of processed fruit basis. The difference in cost of processing sour cherries of various grades was then determined.

Two types of analyses are presented. In one it was assumed that the processor paid a standard rate per pound for cherries regardless of grade and then sold a one-grade product, as has been done in the past and is presently done by most processors in the state. In the other analysis the processor paid the grower according to grade of sour cherries delivered at the processing plant and sold the processed product according to grade, as was done at the Garn L. Baum processing plant in 1960.

Costs of freezing, brokerage fees, and transporting sour cherries to market were obtained from the processor as well as the average receipts for each grade of sour cherries processed and sold. The net returns per pound of sour cherries of each grade were then determined.

The difference in net returns was determined between the method of

purchasing at a standard rate per pound, processing and selling a one-grade product, as has been done in the past, and the method of purchasing, processing, and selling a graded product as was done by the Garn L. Baum processing plant in 1960.

PRESENTATION AND ANALYSIS OF DATA

Degree of Variation in Grade of Sour Cherries Being Produced

Due to the difference in circumstances associated with the two seasons in which data were collected to determine the degree of variation in the grade of sour cherries being produced, the presentation and analysis of data for each season is presented separately. The frost of 1959 made the study for that season primarily a guide for the study of 1960. Sour cherries were not considered produced until delivered to processing plants.

Degree of variation in grade of sour cherries produced in 1959

The average[1] grade of sour cherries produced by a random sample of 20 growers in Utah, Weber, and Box Elder Counties varied from 62.5 to 93 percent U.S. No. 1 quality (Table 1). This was a range of 30.5 percentage points. No growers represented in the sample had an average grade that would be classified as U.S. No. 1, six growers had average grades that would be classified as U.S. No. 2, and 14 growers had average grades that would be placed in the unclassified grade.[2] Cherries

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[1]The average referred to in 1959 was computed on the basis of lots of sour cherries delivered to processing plants and not according to weight.

[2]"U.S.No. 1 shall consist of sour cherries which are fairly well colored (1), free from decay, worms, pulled pits (2), attached stems (3), and free from damage (4), caused from bird pecks, hail marks, limbrubs, windwhips and other scars, sunscald, shriveling, foreign material, disease,

grading at least 88 percent U.S. No. 1 quality are considered necessary to enable a processor to pack an "A" grade pack. Six growers averaged a quality high enough to enable the processor to pack an "A" grade.[1] Ten growers had individual lots that were in this grade range.

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insects, mechanical or other means.

"UNLESS OTHERWISE SPECIFIED, each cherry shall have a diameter(5) of not less than 5/8 inch.

"In order to allow for variations incident to proper handling, not more than a total of 7 percent by weight, of any lot of cherries may fail to meet all of the requirements of this grade, but not more than five-seventh of this amount, or 5 percent, may fail to meet the grade requirements other than for attached stems, and no part of this tolerance shall be allowed for cherries which are affected by worms.

"U.S. No. 2 shall consist of sour cherries which meet all of the requirements of U.S. No. 1 grade, except that a total tolerance of 12 percent, by weight, of any lot of cherries shall be permitted for grade defects, but not more than five-sixths of this amount, or 10 percent, may fail to meet the grade requirements other than for attached stems, and no part of this tolerance shall be allowed for cherries which are affected by worms.

"Unclassified shall consist of cherries which do not meet the requirements of either of the foregoing grades. The term 'unclassified' is not a grade within the meaning of these standards but is provided as a designation to show that no definite grade has been applied to the lot." (3)

Sour cherries grading above 93.5 percent U.S. No. 1 quality were considered as U.S. No. 1. Those grading from 88 to 99 percent U.S. No. 1 quality were considered as U.S. No. 2. Those grading below 88 percent U.S. No. 1 quality were considered as unclassified.

[1] "'U.S. GRADE A' OR 'U.S. FANCY' is the quality of frozen red sour (tart) pitted cherries that possess similar varietal characteristics; that possess a good red color; that are practically free from defects; that possess a good character; that possess a normal flavor; and that score not less than 85 points when scored in accordance with the scoring system outlined in this section. In addition to the foregoing requirements, such frozen red sour (tart) pitted cherries may contain not more than 5 percent, by count, of cherries that are less than 9/16 inch in diameter.

"'U.S. GRADE C' OR 'U.S. STANDARD' is the quality of frozen

The range in grade between lots delivered by individual growers where two or more lots were inspected, varied from 4 to 44 percentage points, averaging 17.47 percentage points.

Individual lots of sour cherries delivered to the processing plant varied in grade from 43 to 96 percent U.S. No. 1 quality. This represents a range of 53 percentage points.

By separating individual lots of cherries according to grade processors could probably have packed an "A" grade from part of the sour cherries delivered to processing plants during 1959. By mixing all cherries delivered at processing plants together, as was done, processors packed a "C" grade which sold for a price considerably below that of the "A" grade pack.

Growers and processors were generally of the opinion that the average grade of sour cherries produced would be considerably higher in a normal year than was the case in 1959.

Degree of variation in grade of sour cherries produced in 1960

The grade of sour cherries of 83 growers delivering 728,444 pounds of sour cherries to the Garn L. Baum Processing Plant in Provo, Utah varied from 78.14 to 97.93 percent U.S. No. 1 quality, with a weighted

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red sour (tart) pitted cherries that possess similar varietal characteristics; that possess a reasonably good red color; that are fairly free from defects; that possess a fairly good character; that possess a normal flavor; and score not less than 70 points when scored in accordance with the scoring system outlined in this section. There is no size requirement for such frozen red sour (trat) pitted cherries.

"'U.S. GRADE D' OR 'SUBSTANDARD' is the quality of frozen red sour (tart) pitted cherries that fail to meet the requirements of U.S. GRADE C OR U.S. STANDARD." (3)

Table 1. Degree of variation among growers in grade of sour cherries produced, Utah, 1959

Grower	Lots inspected	Variation in grade	Range in grade	Average U.S.No.1 quality
	Number	Percent	Percentage points	Percent
1	1	93	0	93.00
2	5	87 - 96	9	92.20
3	2	90 - 94	4	92.00
4	2	88 - 93	5	90.50
5	2	88 - 92	4	90.00
6	2	85 - 91	6	88.00
7	2	78 - 96	18	87.00
8	1	87	0	87.00
9	4	79 - 91	12	86.65
10	3	80 - 95	15	86.40
11	1	85	0	85.00
12	5	67 - 85	18	79.40
13	7	57 - 88	31	77.14
14	4	71 - 82	11	76.00
15	2	67 - 83	16	75.00
16	5	60 - 87	27	74.00
17	14	43 - 87	44	72.70
18	4	56 - 76	20	68.00
19	6	43 - 83	40	65.17
20	2	54 - 71	17	62.50

average[1] of 88.46 percent U.S. No. 1 quality (Table 2). This represents a range of 19.79 percentage points, which is considerably less than the range of 30.50 percentage points noted in 1959. Twenty-six growers had average grades that would be classified as U.S. No. 1, 42 growers had average grades that would be classified as U.S. No. 2, and 15 growers had average grades that would be placed in the unclassified grade. Sixty-eight growers, or 81.93 percent of the total, averaged a quality high enough to enable the processor to pack an "A" grade.

The range in grade between lots delivered by individual growers where five or more lots were inspected, varied from 2 to 41 percentage points, averaging 12.8 percentage points.

Individual lots of sour cherries delivered to the processing plant varied in grade from 50 to 99 percent U.S. No. 1 quality. This represents a range of 49 percentage points. Seventy-six growers, or 91.57 percent of the total, had lots of cherries grading 88 percent or above U.S. No. 1 quality.

Eight growers, representing the upper 10 percent of growers gradewise delivered 12,941 pounds of cherries to the processing plant and had a weighted average grade of 97.18 percent U.S. No. 1 quality. Eight growers, representing the lower 10 percent of growers gradewise, delivered 167,354 pounds of cherries to the processing plant and had a weighted average grade of 78.58 percent U.S. No. 1 quality (Table 3). This was a range of 18.60 percentage points between the weighted average grade of the upper and lower 10 percent of the growers. Cherries of the

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[1]The weighted average referred to was computed on a weight basis.

Table 2. Degree of variation among growers in grade of sour cherries produced, Utah County, 1960

Grower	Lots inspected	Total pounds	Variation in grade	Range in grade	Weighted average U.S. No. 1 quality
	Number	Pounds	Percent	Percentage points	Percent
1	1	74	94	0	94.00
2	1	126	94	0	94.00
3	2	207	96 - 98	1	96.92
4	3	222	90 - 93	3	91.33
5	2	240	90 - 92	2	90.83
6	2	242	92 - 98	6	96.98
7	2	274	82 - 84	2	82.96
8	1	307	80	0	80.00
9	1	325	90	0	90.00
10	2	331	85 - 98	13	95.05
11	3	404	95	0	95.00
12	1	412	88	0	88.00
13	1	417	90	0	90.00
14	2	477	82	0	82.00
15	3	499	95 - 98	3	95.52
16	3	507	92 - 97	5	93.64
17	1	553	91	0	91.00
18	2	558	96 - 98	2	96.89
19	3	561	92 - 97	5	95.40
20	3	562	86 - 93	7	91.19
21	4	599	97 - 99	2	97.93
22	5	673	93 - 97	4	95.77
23	2	704	82 - 88	6	83.87
24	3	724	95 - 96	1	95.70
25	3	816	86 - 95	9	89.61
26	4	825	96 - 99	3	97.67
27	8	904	84 - 98	14	92.12
28	6	931	90 - 98	8	95.31
29	5	1088	70 - 87	17	83.59
30	10	1184	88 - 98	10	93.51
31	5	1194	91 - 98	7	94.98
32	2	1195	88 - 97	9	93.05
33	3	1213	94 - 97	3	95.57
34	4	1343	85 - 95	10	90.15
35	4	1482	78 - 95	17	88.87
36	8	1486	95 - 98	3	97.08
37	3	1552	85 - 93	8	89.76
38	2	1741	91 - 95	4	93.89
39	4	1791	83 - 92	9	89.43
40	1	2137	84	0	84.00
41	4	2181	92 - 95	3	92.39
42	4	2328	90 - 95	5	92.72

Table 2. (cont'd.)

Grower	Lots inspected	Total pounds	Variation in grade	Range in grade	Weighted average U.S. No. 1 quality
	Number	Pounds	Percent	Percentage points	Percent
43	2	2,360	92 - 93	1	92.87
44	3	2,405	85 - 94	9	88.78
45	2	2,468	90 - 94	4	92.54
46	5	2,810	86 - 94	8	91.57
47	2	2,891	90	0	90.00
48	10	3,103	68 - 91	23	83.50
49	5	3,287	96 - 98	2	96.82
50	10	3,464	75 - 99	24	95.64
51	3	3,925	85 - 90	5	88.37
52	5	3,970	86 - 94	8	90.41
53	11	4,012	82 - 99	17	92.95
54	4	4,396	81 - 89	8	83.42
55	2	4,654	88 - 90	2	88.12
56	7	4,972	90 - 95	5	91.57
57	5	4,992	85 - 96	11	89.02
58	3	5,433	73 - 90	17	79.68
59	8	5,602	82 - 94	12	90.92
60	6	5,737	95 - 98	3	97.32
61	8	5,792	95 - 98	3	96.15
62	8	5,884	90 - 95	5	93.47
63	11	6,045	74 - 92	18	87.60
64	6	7,183	50 - 91	41	82.95
65	15	7,223	90 - 98	8	94.14
66	2	7,364	84	0	84.00
67	14	8,459	80 - 92	12	84.69
68	10	8,855	85 - 98	13	95.01
69	23	8,915	91 - 99	8	95.60
70	6	9,336	89 - 93	4	92.01
71	10	9,668	78 - 96	18	90.00
72	10	11,463	88 - 96	8	92.98
73	9	13,464	90 - 94	4	91.60
74	17	14,900	80 - 96	16	91.84
75	5	16,091	64 - 83	19	78.45
76	7	18,541	85 - 95	10	91.57
77	9	20,947	88 - 95	7	89.70
78	16	28,093	75 - 97	22	93.41
79	19	39,408	81 - 95	14	89.56
80	28	48,399	85 - 97	12	91.18
81	32	67,755	83 - 95	12	91.49
82	47	125,596	70 - 95	25	91.60
83	33	133,193	74 - 88	14	78.14

upper 10 percent of the growers would make an "A" grade pack without sorting, while cherries of the lower 10 percent would have to be sorted to make a "C" grade pack. The low 10 percent of the growers gradewise delivered a much larger quantity of sour cherries than the high 10 percent.

Table 3. Degree of variation in grade of sour cherries produced in 1960 between the upper and lower 10 percent of growers gradewise, Utah County, 1960

Item	Number of growers	Number of pounds delivered	Weighted average percent U.S.No.1 quality
Upper 10 percent of growers	8	12,941	97.18
Lower 10 percent of growers	8	167,354	78.58

The grade of sour cherries delivered to the processing plant during 1960 was considerably higher in all respects and the variation in grades less than during 1959. This variation between seasons was probably due to two factors. The 1960 sour cherry crop was approximately 70 percent of normal while that of the 1959 crop was approximately 10 percent of normal. The other factor was the method paying the grower. In 1960 Garn L. Baum paid the grower according to the percent of U.S. No. 1 quality cherries delivered to the processing plant. In 1959 all processors in Utah paid growers a standard price per pound regardless of the quality delivered to the processing plants.

By separating individual lots of cherries according to grade, the processor could probably have packed an "A" grade pack from the majority

of sour cherries delivered to the processing plant during 1960. All lots of sour cherries grading above 88 percent U.S. No. 1 quality were processed according to grade and brought an "A" grade price. Those processed from sour cherries grading U.S. No. 1, graded "A". Some samples of those processed from sour cherries grading U.S. No. 2 failed to grade "A" because of color variation. While processed grades are influenced by color variation, the U.S. grades for unprocessed red sour cherries for manufacture requires only a minimum color. This discrepancy in grades makes it difficult for processors to produce an "A" grade pack regardless of the quality of sour cherries delivered to the processing plant according to U.S. standards if there is a color variation. By separating lots of sour cherries delivered to the processing plant by grade and color, the processor could have made an "A" grade pack from most sour cherries grading 88 percent and above U.S. No. 1 quality.

Degree of variation in grade of sour cherries produced in 1960 by date delivered to the processing plant

The weighted average grade of sour cherries delivered to the processing plant by date of delivery varied from 80.61 to 94.89 percent U.S. No. 1 quality with a weighted average for all days of 88.46 percent U.S. No. 1 quality (Table 10). This represents a range of 14.28 percentage points.

Of the 31 days the experiment was conducted, the weighted average grade was above 88 percent U.S. No. 1 quality 16 days, and below 15 days. From July 6th to 13th the weighted average grade was below 88 percent U.S. No. 1 quality. From July 13th to 20th it was above 88 percent U.S.

No. 1 quality. From July 20th to July 30th it was below 88 percent U.S. No. 1 quality, and from July 30th to August 5th it was above 88 percent U.S. No. 1 quality (Figure 1).

Most of this variation can be accounted for by the method of paying growers and by the particular growers delivering to the processing plant at any particular time. At the start of the season most growers were not informed as to the method of payment. The grade of many growers improved after they were informed of the method of payment. This was brought about by better picking and handling controls. During the second period most growers were informed of the price and method of payment, and the grade was higher.

During the third period a high proportion of the cherries was delivered by one grower. This grower delivered 133,193 pounds of sour cherries. His weighted average grade was 78.14 percent U.S. No. 1 quality (Table 2). After this grower finished picking, the weighted average grade again was above 88 percent U.S. No. 1 quality.

Difference in Costs, Receipts, and Returns of Processing Sour Cherries of Various Grades

A record of all sour cherries delivered to the processing plant was kept during 1960. Lots of sour cherries delivered were separated into grades and costs of processing each grade were computed. Since a portion of the sour cherries processed was not sold at the time of this writing, receipts for the different grades were computed on the average price received for those sold as reported by the processor. The various costs associated with processing each of the three grades will be discussed in detail.

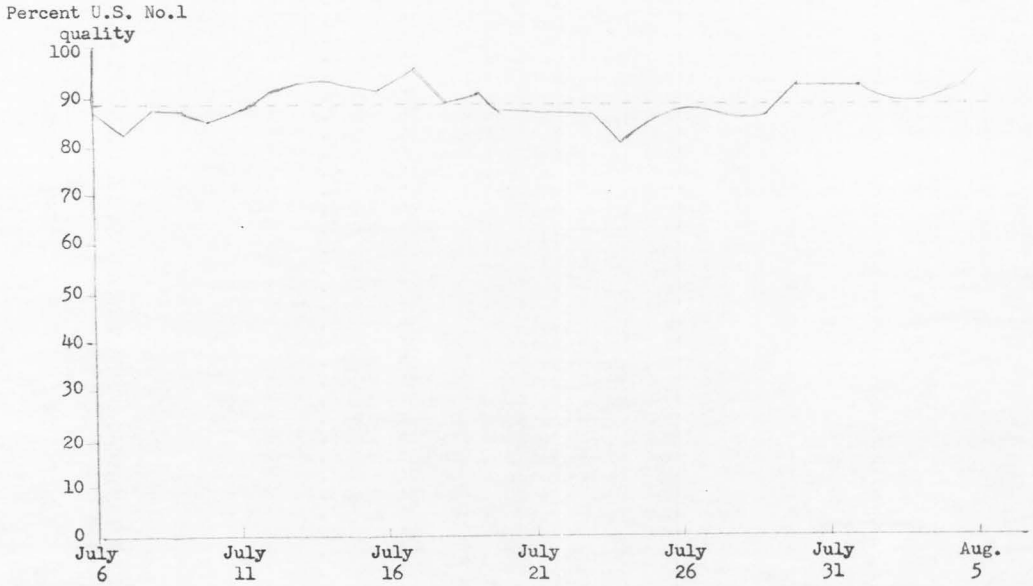

Figure 1. Degree of variation in sour cherries produced in 1960 by date delivered to the processing plant. Broken line shows 88 percent U.S. No. 1 quality

The costs, receipts, and net returns of processing and marketing sour cherries by grade were determined for one processing plant. It is expected that these costs, receipts, and returns would vary depending upon the processing plant in question.

Quantity and grade of sour cherries delivered to the processing plant

Eighty-three growers delivered a total of 728,444 pounds of sour cherries to the processing plant during the 1960 season. They graded as follows: 209,026 pounds, 28.70 percent of the total, graded below 88 percent, averaged 80 percent U.S. No. 1 quality; 379,249 pounds, 52.06 percent of the total, graded 88 to 94 percent, averaged 91 percent U.S. No. 1 quality; 140,169 pounds, 19.24 percent of the total, graded 94 percent and over, averaged 95.00 percent U.S. No. 1 quality (Table 4).

Table 4. Quantity and grade of sour cherries delivered to the processing plant, Utah County, 1960

Item	Grade		
	Below 88 percent U.S. No. 1 quality	88 to 94 percent U. S. No. 1 quality	94 percent and over U.S. No. 1 quality
Weight of sour cherries delivered to the processing plant expressed in pounds	209,026	379,249	140,169
Percent of total	28.70	52.06	19.24
Number of tanks processed	35	59	26
Weighted average percent U.S. No. 1 quality	80	91	95

Yields resulting from processing sour cherries delivered to the processing plant in 1960

The proportion of sour cherries recovered as processed product was 90 percent of the total before processing for sour cherries grading below 88 percent U.S. No.1 quality, 88.6 percent for those grading 88 to 94 percent U.S. No. 1 quality, and 90.9 percent for those grading 94 percent and above U.S. No. 1 quality (Table 5). This represents a range of 2.3 percentage points. The amount of weight losses due to culls, pits and foreign material were responsible for this variation.

It is anticipated that the rate of processing would be somewhat dependent upon the quality of sour cherries being processed. This, however, was not the case. The rate of flow and processing was regulated according to the capacity of the pitting machines.

The percent of sour cherries sorted out was 4.0 percent of the total before processing for sour cherries grading below 88 percent U.S. No. 1 quality, 3.2 percent for those grading 88 to 94 percent U.S. No. 1 quality, and 2.2 percent for those grading 94 percent and over U.S. No. 1 quality. This represented a range of 1.8 percentage points.

All sour cherries not grading U.S. No. 1 quality can be considered defective. In the sour cherries grading below 88 percent U.S. No. 1 quality, only 20 percent of the defective sour cherries were removed; in those grading 88 to 94 percent U.S. No. 1 quality, 36 percent of the defective sour cherries were removed; and in those grading 94 percent and above U.S. No. 1 quality, 44 percent of the defective sour cherries were removed. After sorting it was estimated that sour cherries grading below 88 percent U.S. No. 1 quality were 84 percent defect free; for those

Table 5. Yields resulting from processing sour cherries delivered to the processing plant, Utah County, 1960

Item	Grade		
	Below 88 percent U.S. No.1 quality	88 to 94 percent U.S. No.1 quality	94 percent and over U.S. No.1 quality
Results of processing expressed in pounds of total			
1. Recovered as processed product	188,126	336,012	127,359
2. Sorted out as culls	8,296	12,223	3,154
3. Pits and foreign material	12,604	31,014	9,656
Total	209,026	379,249	140,169
Results of processing expressed in percent of total			
1. Recovered as processed product	90.0	88.6	90.9
2. Sorted out as culls	4.0	3.2	2.2
3. Pits and foreign material	6.0	8.2	6.9
Total	100.0	100.0	100.0

grading 88 to 94 percent U.S. No. 1 quality 94 percent defect free; and for those grading 94 percent and over U.S. No. 1 quality 97 percent defect free.

Where sour cherries are processed according to grade, this method of regulating the flow according to capacity of the pitters is quite effective as the "A" grade has a 10 percent tolerance for grade defects and the "C" grade has a 20 percent tolerance. By sorting out the percentages of culls noted, most of the shriveled and other badly defective fruit, that ruin the appearance of a pack, were removed from the higher grades. Where sour cherries are not processed according to grade, regulating the flow according to the capacity of the pitters might be very ineffective.

For sour cherries grading below 88 percent U.S. No. 1 quality 6 percent of the total was pits and foreign material; for those grading 88 to 94 percent U.S. No. 1 quality pits and foreign material were 8.2 percent of the total; and for those grading 94 percent and above U.S. No. 1 quality pits and foreign material accounted for 6.9 percent of the total. This represented a range of 2.2 percentage points. This variation could be accounted for by size and maturity of sour cherries delivered to the processing plant as well as cleanliness in picking.

Product cost of processing sour cherries

The finished product is made up of processed sour cherries and sugar. A 30-pound can of finished product is composed of 25 pounds of pitted sour cherries and 5 pounds of sugar, a 5 to 1 ratio. Product cost refers to the costs of sour cherries and sugar.

The cost of sour cherries was dependent upon the price per pound paid the grower (Table 6), and the cost of losses due to culls sorted out, pits, and foreign material (Table 7). Costs due to losses were computed by determining the cost of all losses per pound of processed product, according to grade, and then subtracting the return for culls sorted out per pound of processed product. The cost of sour cherries after pitting[1] was determined by adding the price per pound paid the grower and the cost per pound of weight losses. The cost of sour cherries per pound of finished product[2] was then calculated.

Table 6. Method of paying the grower according to quality of sour cherries delivered to the processing plant, Utah County, 1960

Percent U.S. No. quality	Cents per pound
100	8.14
99	8.06
98	7.98
97	7.90
96	7.83
95	7.75
94	7.67
93	7.60
92	7.52
91	7.44
90	7.36
89	7.29
88	7.21
Below 88	7.00

[1]After pitting refers to pitted processed sour cherries before the addition of sugar.

[2]Finished product refers to pitted processed sour cherries and sugar. It is the product offered for sale.

Table 7. Product cost of processing sour cherries, Utah County, 1960

Costs	Grade		
	Below 88 percent U.S. No.1 quality	88 to 94 percent U.S. No.1 quality	94 percent and over U.S. No. 1 quality
	Cents per pound		
Cost of sour cherries delivered to processing plant	7.00	7.43	7.75
Loss of value due to culls, pits, and foreign material			
1. Total cost	0.78	0.95	0.78
2. Return on culls	0.22	0.18	0.12
Net cost	0.56	0.77	0.66
Cost of sour cherries after pitting	7.56	8.20	8.41
Cost of sour cherries computed on a finished product basis	6.30	6.83	7.01
Sugar costs on a finished product basis	1.50	1.50	1.50
Cost of sour cherries and sugar computed on a finished product basis	7.80	8.33	8.51

Sugar cost 9 cents a pound or 45 cents per can of finished product. The cost of sugar per pound of finished product was 1.5 cents regardless of grade processed.

Cost of sour cherries grading below 88 percent U.S. No. 1 quality were 7.80 cents per pound of finished product, for those grading 88 to 94 percent U.S. No. 1 quality 8.33 cents per pound of finished product, and for those grading 94 percent and over U.S. No. 1 quality 8.51 center per pound of finished product. This was a range in cost of 0.71 cents. The price paid the grower for the different grades of sour cherries was primarily responsible for this difference in costs.

Costs and rates of processing sour cherries

Costs of processing sour cherries included both variable and fixed costs. Variable costs were subdivided into four sections: product cost, variable labor costs, can and lid costs, and other variable costs (Table 8).

Product costs and the method of deriving them were discussed in the preceding section.

Variable labor costs were labor costs directly associated with processing individual tanks of sour cherries. They were determined for each tank processed. All workers associated with processing individual tanks were paid $1.00 per hour except one who only worked occasionally at this work and was paid $1.25 an hour. For sour cherries grading below 88 percent U.S. No. 1 quality, variable labor costs were 0.33 cents per pound of finished product; for those grading 88 to 94 percent U.S. No. 1 quality they were 0.31 cents per pound of finished product; and for those grading

Table 8. Costs of processing sour cherries, Utah County, 1960

Costs	Grade		
	Below 88 percent U.S. No.1 quality	88 to 94 percent U.S. No.1 quality	94 percent and over U.S. No.1 quality
	Cents per pound of finished product		
Variable costs			
1. Product costs	7.80	8.33	8.51
2. Variable labor costs	0.33	0.31	0.29
3. Can and lid costs	1.67	1.67	1.67
4. Other variable costs	0.18	0.18	0.18
Total	9.98	10.49	10.65
Fixed costs	1.46	1.46	1.46
Net costs of processing	11.44	11.95	12.11

94 percent and above U.S. No. 1 quality they were 0.29 center per pound of finished product. This shows a range of 0.04 cents per pound. It was expected that this range would be greater. However, the processor used the same number of sorters regardless of the grade being processed. The processor could have reduced costs by releasing some of his sorters when he processed sour cherries grading 94 percent or over U.S. No. 1 quality.

While conducting the study on variable labor costs of processing individual tanks of sour cherries, the rates of processing various grades were determined on a rate per man hour of variable labor associated with processing individual tanks (Table 11). For sour cherries grading below 88 percent, U.S. No. 1 quality, 302.22 pounds of finished product per man hour were processed. This amounted to .0033 man hours per pound of finished product. For those grading 88 to 94 percent U.S. No. 1 quality 323.04 pounds of finished product were processed per man hour. This amounted to .0031 man hours per pound of finished product. For those

grading 94 percent and over U.S. No. 1 quality 343.05 pounds of finished product were processed per man hour. This amounted to .0029 man hours per pound of finished product. These different rates of processing accounted for the differences in variable labor costs.

The cost of cans and lids were 50 cents each, or 1.67 cents per pound of finished product regardless of the grade of sour cherries being processed (Table 7).

Other variable costs included labor that could not be assigned to processing individual tanks, electricity, and inspection fees. The labor involved was that used in loading and unloading trucks, maintenance, dock work, and other odd jobs along with labor due to breakdowns and rest periods. These costs were as follows: labor $857.00, electricity $150.00, and inspection fees $400.00--a total of $1,407.00. This amounted to a cost per pound of finished product of 0.18 cents regardless of the grade being processed.

Fixed costs included: management, depreciation and repairs on buildings, machinery and boxes, return on investment, rent on pitters, and taxes (Table 12). These costs were 1.46 cents per pound of finished product regardless of the grade being processed.

Net costs of processing sour cherries grading below 88 percent U.S. No. 1 quality were 11.44 cents per pound of finished product; for those grading 88 to 94 percent U.S. No. 1 quality they were 11.95 cents per pound of finished product; and for those grading 94 percent and over U.S. No. 1 quality they were 12.11 cents per pound of finished product (Table 7), a range of .67 cents per pound.

The three costs of processing sour cherries that varied according to

grade were costs of the sour cherries, losses due to culls, pits, and foreign material, and variable labor costs. Most of the variation in costs of processing sour cherries by various grades was due to the price paid the growers.

Costs, receipts, and net returns of processing and marketing sour cherries

Costs of freezing, brokerage fees, and transporting sour cherries to market were estimated by the processor as being approximately 2 cents per pound of finished product delivered to the West Coast markets (Table 9).

Average prices received for sour cherries delivered to the West Coast markets as quoted by the processor were 15 pents per pound on finished product for sour cherries grading less than 88 percent U.S. No. 1 quality, and 16 cents per pound on finished product for those grading 88 percent and above No. 1 quality. A higher price was not received for sour cherries grading 94 percent and over U.S. No. 1 quality. By having this superior product, however, the processor was able to sell to firms he had never been able to before. Even though this higher quality sour cherry pack cost the processor .16 cents per pound to process and market above the next highest quality, and the receipts were the same, he considered himself ahead because of ease in marketing and new markets developed.

The net returns received for the three grades of sour cherries processed were: 1.56 cents per pound of finished product for sour cherries grading below 88 percent U.S. No. 1 quality; 2.05 cents per pound of finished product for those grading 88 to 94 percent U.S. No. 1 quality; and 1.89 cents per pound of finished product for those grading 94 percent and above U.S. No. 1 quality.

Table 9. Costs, receipts, and returns of processing and marketing sour cherries, Utah County, 1960

Item	Grade		
	Below 88 percent U.S. No. 1 quality	88 to 94 percent U.S. No. 1 quality	94 percent and over U.S. No.1 quality
	Cents per pound of finished product		
Costs of processing	11.44	11.95	12.11
Cost of freezing, brokerage fees, and transportation	2.00	2.00	2.00
Total costs	13.44	13.95	14.11
Sale price	15.00	16.00	16.00
Net returns	1.56	2.05	1.89
Pounds of finished product	225,751	403,214	152,831
Net returns (dollar)	3,522.00	8,266.00	2,889.00

The net returns received for all three grades of sour cherries, where they were purchased, processed, and sold according to grade was $14,677.00. If they had been purchased according to a standard rate per pound regardless of grade, processed and sold as a "C" grade product, the net returns would have been $12,186.00, if the processor had paid the grower 7 cents per pound for sour cherries delivered to the processing plant as did his highest paying competitor.[1] by purchasing, processing, and marketing his

[1]To determine net returns the processor would have made by not purchasing, processing, and marketing accord to grade, the total cost of processing and marketing the finished product was calculated to be $ $108,154.00. The additional amount paid for high quality sour cherries, which was $2,670.00 and $400.00 for inspection fee was subtracted, making a net processing and marketing cost of $105,084.00. The total receipts at 15 cents per pound for finished product, which came to $117,270.00, were then computed. The difference between the two was $12,186.00, which would have been the net returns realized by the processor, if he would not have purchased, processed, and marketed according to grade. This would have amounted to 1.56 cents per pound net returns on a finished product basis.

product according to grade, the processor increased his net returns $2,491.00, an increase of over 20 percent.

Growers as well as the processor benefited as a result of purchasing, processing, and marketing according to grade. An average additional price of .43 cents per pound was paid for sour cherries grading from 88 to 94 percent U.S. No. 1 quality, and .75 cents per pound for sour cherries grading 94 percent and over U.S. No. 1 quality. This increased receipts to growers from $50,990.00 to $53,661.00, a difference of $2,670. This was an increase of .37 cents per pound for all sour cherries delivered to the processing plant. The additional receipts to the growers and processor resulting by handling sour cherries according to grade amounted to $5,161.00 during the 1960 sour cherry season at this one plant.

SUMMARY

The purpose of this study was to determine the degree of variation in the quality of sour cherries being produced in Utah, and to determine the difference in costs, receipts, and net returns of processing sour cherries of various grades. It was based on data collected during 1959 and 1960.

In 1959 sour cherries of a random sample of 20 growers were inspected upon delivery at processing plants. Due to the frost of 1959, leaving only 10 percent of a crop, and the general belief that the quality of sour cherries was below normal, this study was primarily a guide for the study of 1960.

The average grade among growers in 1959 varied from 62.5 to 93 percent U.S. No. 1 quality, a range of 30.5 percentage points. No growers in the sample had an average grade that would be classified as U.S. No. 1, 6 had grades that would be classified as U.S. No. 2, and 14 had grades that would be placed in the unclassified grade. Sour cherries grading at least 88 percent U.S. No. 1 quality are considered necessary to enable the processor to pack an "A" grade. Six growers had average grades, and 10 growers had individual lots of sour cherries that were in that grade range. Individual lots of sour cherries varied from 43 to 96 percent U.S. No. 1 quality, a range of 53 percentage points.

During 1960 a record was kept of all sour cherries delivered to, processed by, and sold by the Garn L. Baum processing plant in Provo,

Utah. Eighty-three growers delivered 728,444 pounds of sour cherries to the processing plant. They graded as follows: 209,026 pounds graded below 88 percent, averaged 80 percent U.S. No. 1 quality; 379,249 pounds graded 88 to 94 percent, averaged 91 percent U.S. No. 1 quality; 140,169 pounds graded 94 percent and over, averaged 95 percent U.S. No. 1 quality. The weighted average grade for all sour cherries delivered to the processing plant was 88.46 percent U.S. No. 1 quality.

The weighted average grade among growers varied from 62.5 to 93 percent U.S. No. 1 quality. Twenty-six growers had weighted average grades that would be classified as U.S. No. 1, 42 growers had weighted average grades that would be classified as U.S. No. 2, and 15 growers had weighted average grades that would be placed in the unclassified grade. Sixty-eight growers had weighted average grades and 76 growers had individual lots of sour cherries with a high enough quality to enable the processor to pack an "A" grade. Individual lots of sour cherries varied from 50 to 99 percentU.S. No. 1 quality, a range of 49 percentage points.

Net costs of processing sour cherries grading below 88 percent U.S. No. 1 quality were 11.44 cents per pound of finished product; for those grading 88 to 94 percent U.S. No. 1 quality they were 11.95 cents per pound of finished product, and for those grading 94 percent and over U.S. No. 1 quality they were 12.11 cents per pound of finished product, a range of .67 cents per pound. The difference in price paid the grower, depending on the grade of sour cherries delivered at the processing plant, was primarily responsible for the difference in cost of processing the three grades of sour cherries.

Costs of freezing, brokerage fees, and transporting sour cherries to market were estimated by the processor as being approximately 2 cents per pound of finished product delivered to the West Coast markets.

Average prices received for sour cherries delivered to the West Coast markets as quoted by the processor were 15 cents per pound on finished product for sour cherries grading less than 88 percent U.S. No. 1 quality, and 16 cents per pound on finished product grading 88 percent and above U.S. No. 1 quality.

The net returns received for the three grades of sour cherries processed were 1.56 cents per pound of finished product for sour cherries grading below 88 percent U.S. No. 1 quality, 2.05 cents per pound of finished product for those grading from 88 to 94 percent U.S. No. 1 quality, and 1.89 cents per pound of finished product for those grading 94 percent and above U.S. No. 1 quality, a range of .49 cents per pound.

The net return received for all three grades of sour cherries, where they were purchased, processed, and sold according to grade, was $14,677.00 in 1960. This is an increase of $2,491.00 over the $12,186.00 net return he would have realized if he had not purchased, processed, and marketed according to grade.

By purchasing according to grade, receipts to growers were increased from $50,991.00 to $53,661.00, a difference of $2,670.00. The additional receipts to growers and processor by handling sour cherries according to grade amounted to $5,161.00 during the 1960 sour cherry season at this one processing plant.

CONCLUSIONS

Results of this study show there is a large variation in quality of sour cherries being produced in Utah, and that there is an economic difference in costs, receipts, and net returns of processing sour cherries of various grades.

The large variation in grade comes about as a result of many factors, part of which the grower can control and part resulting from natural factors beyond the control of growers, once planting has taken place. Growers located in wind belts would have a difficult time making the 88 percent U.S. No. 1 quality necessary to pack an "A" grade.

Before Utah sour cherry growers will adopt better production, harvesting and handling methods, a new system of payment must be adopted. If the grower is paid a standard rate per pound of sour cherries delivered to the processing plant, his main concern is to produce maximum volume at minimum cost and effort. Where the grower is paid according to quality as well as quantity delivered, he is interested in producing a large volume of high quality fruit at minimum cost and effort. Upon being informed as to the method of payment used by the processor in the experiment, most growers who delivered to the processing plant in 1960 increased their grades considerably through better harvesting methods alone. If this method of paying the grower, according to grade, is adopted by Utah sour cherry processors, the average sour cherry grade will increase considerably in the future.

If the variation in grade were slight, it would benefit the industry for the processor to pay a standard rate per pound to the grower, process, and market a one-grade product. Where the variation in grade is large, as was noted in this study, this method of handling sour cherries results in a very nonuniform pack that will meet the grade requirements of only the pack produced by the poorer quality sour cherries being processed.

By handling sour cherries according to grade and color delivered to the processing plant, a graded product can be marketed with the lowest grade probably being as high as the one grade produced by the method of handling a one-grade product.

Purchasing, processing, and further marketing sour cherries according to grade delivered at the processing plant would benefit both Utah growers and processors. By paying on a graded basis, the processor would receive a higher quality fruit. By processing this higher quality fruit according to grade, he would increase his receipts and improve his markets. Competition in turn would force him to pass part of these increased returns back to the grower. This method of handling sour cherries would also improve the Utah sour cherry pack to where it is competitive with other areas.

On the basis of the experiment conducted in 1960, it is estimated that receipts to all Utah growers and processors could be increased approximately $34,000.00 in a normal year[1] at present capacity if sour cherries were purchased, processed, and marketed on a graded basis by the processors.

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[1]A normal year was based upon production in 1957, when production reached 4,800,000 pounds of sour cherries in Utah.

This amount of increased receipts will vary from year to year depending upon size of crop, grade delivered to the processing plant, marketing procedures, and the difference in price of the various processed grades. It is recommended that Utah sour cherry processors purchase, process, and market sour cherries on a graded basis.

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APPENDIX

Table 10. Degree of variation in grade of sour cherries produced in 1960 by date delivered to the processing plant

Date	Lots inspected	Total pounds	Variation in grade	Range in grade	Weighted average percent U. S. No. 1 quality
July 6	10	11,411	83 - 93	10	86.30
July 7	6	7,629	73 - 94	21	82.04
July 8	14	12,254	81 - 96	15	87.75
July 9	26	15,648	50 - 98	48	86.98
July 10	4	7,720	80 - 98	18	85.10
July 11	38	28,679	64 - 98	34	87.09
July 12	38	31,330	80 - 98	18	90.85
July 13	40	30,294	82 - 99	17	92.55
July 14	41	30,881	78 - 98	20	93.20
July 15	28	21,894	83 - 98	15	92.05
July 16	25	18,228	86 - 98	12	91.97
July 17	2	2,241	94 - 97	3	94.89
July 18	37	32,491	80 - 98	18	89.77
July 19	30	37,380	70 - 97	27	90.25
July 20	32	38,217	68 - 99	31	87.72
July 21	27	41,328	75 - 98	23	87.33
July 22	28	44,316	75 - 98	23	86.92
July 23	22	36,627	74 - 99	25	86.09
July 24	6	10,925	74 - 96	22	86.61
July 25	12	34,751	70 - 96	26	85.27
July 26	14	32,146	72 - 97	25	87.64
July 27	15	37,593	76 - 96	20	86.55
July 28	12	32,273	16 - 98	22	85.49
July 29	10	27,332	78 - 95	17	86.50
July 30	11	19,633	75 - 94	19	91.45
July 31	3	6,889	90 - 92	2	91.77
Aug. 1	11	24,610	89 - 92	3	91.12
Aug. 2	10	21,675	85 - 95	10	89.34
Aug. 3	9	15,911	83 - 95	12	89.13
Aug. 4	7	10,443	84 - 94	10	91.00
Aug. 5	3	5,689	94 - 95	1	94.02

Table 11. Product cost of processing sour cherries, Utah County, 1960

Item	Grade		
	Below 88 percent U.S. No.1 quality	88 to 94 percent U.S. No.1 quality	94 percent and over U.S. No. 1 quality
Variable labor costs in dollars	750.32	1,250.84	446.77
Variable labor costs in cents per pound of finished product	.33	.31	.29
Pounds of finished product processed per man hour	302.22	323.04	343.05
Man hours per pound of finished product	.0033	.0031	.0029

Table 12. Fixed costs of processing sour cherries, Utah County, 1960

Item	Replacement value	Depreciation rate and repairs	Cost
	Dollars	Percent	Dollars
Investment			
1. Buildings	20,000.00	10	2,000.00
2. Cold storage	5,000.00	10	500.00
3. Equipment	13,807.00	10	1,381.00
4. Boxes	3,000.00	33 1/3	1,000.00
5. Land	5,000.00		
Total	46,807.00		
Return on investment			2,340.00
Management			3,200.00
Rent on pitters			900.00
Taxes			120.00
Total			11,441.00
Fixed costs computed on a cents per pound of finished product basis			1.46