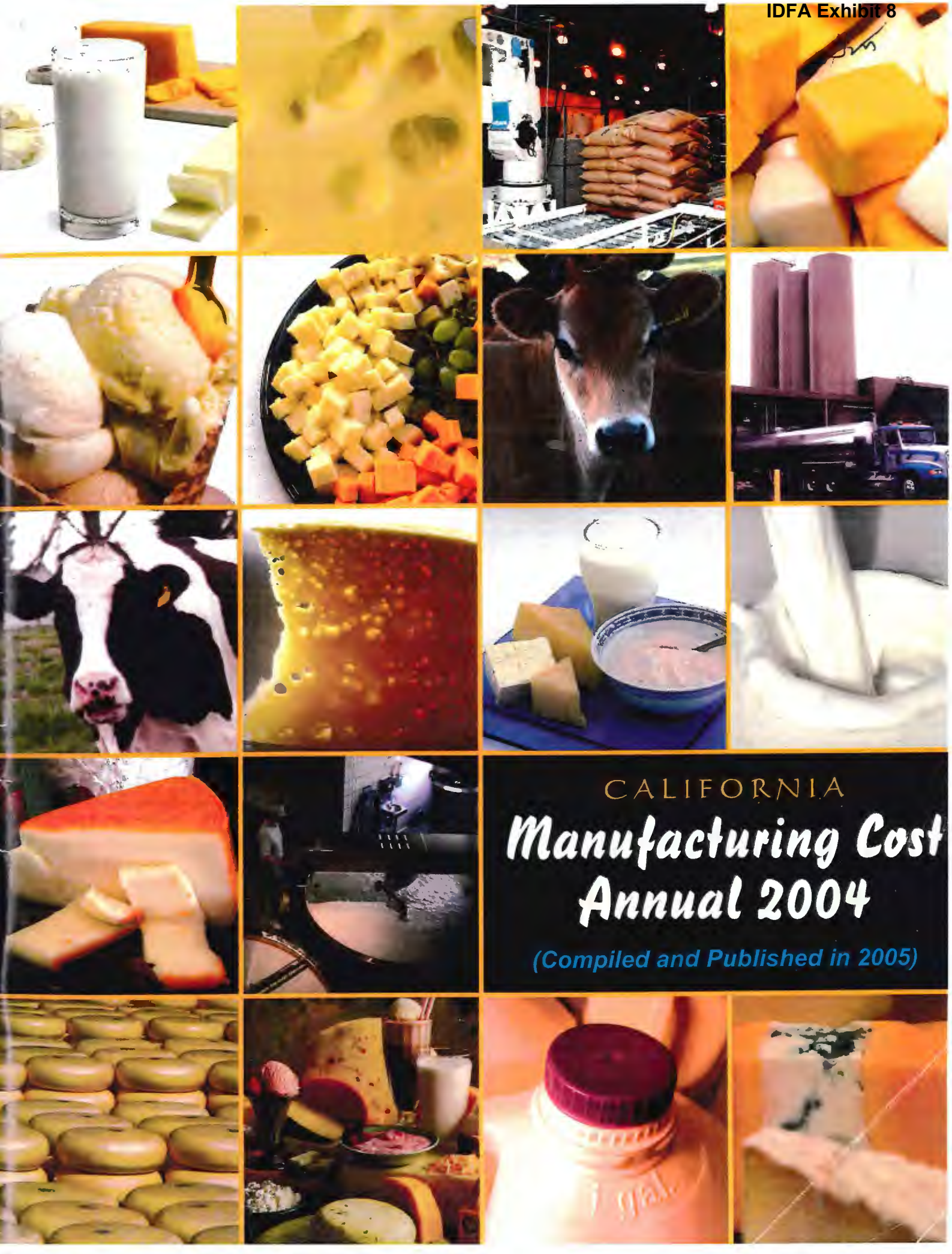

CALIFORNIA

Manufacturing Cost Annual 2004

(Compiled and Published in 2005)

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We welcome your comments on this Manufacturing Cost Annual.
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Introduction

The California Food and Agricultural Code specifies that the Department of Food and Agriculture (Department) must consider manufacturing costs in determining appropriate minimum prices for products categorized as Class 4a (butter and dried milk products) and Class 4b (cheese). Notwithstanding the legislative decree, the Department has a more direct need for the cost studies in light of the end product pricing formulas used to establish milk prices. The studies have been used frequently to establish reasonable manufacturing cost (make) allowances through the public hearing process.

The Department maintains a Manufacturing Cost Unit that collects and summarizes cost data from California dairy manufacturing plants. Any plant that produces Class 4a or Class 4b products may be asked to participate in the cost studies. The study is very nearly a census of California's butter, nonfat dry milk (NFDM) and Cheddar cheese plants. Butter, NFDM, and Cheddar cheese study participants typically account for over 97 percent of respective products manufactured in California. Data on cream and condensed skim were collected concurrently from plants that participated in the butter, NFDM and Cheddar cheese studies. Plants that manufacture cream and condensed skim but do not manufacture butter, NFDM or Cheddar cheese were not included in the study. As a result, data on cream and condensed skim accounted for less volume.

The data from the cost studies have a practical significance beyond the boundaries of California. They are the only studies in the United States which present detailed costs of processing butter, NFDM, and Cheddar cheese over a period of several years. The studies are conducted by professional auditors specializing in dairy cost accounting practices. The auditors review plant records on site and work with plant management to collect data on all aspects of the operation. The auditors also determine allocations of plant expenditures for each product manufactured by the plant. For the plants in the study, the results can help to isolate the actual costs of manufacturing and give benchmark figures obtained from other California manufacturing plants. Consequently, although the Department has the legal authority to collect cost information from the various types of milk processing plants, all plants find the study and resulting comparisons valuable and cooperate in the cost studies voluntarily.

Highlights of the Manufacturing Cost Studies

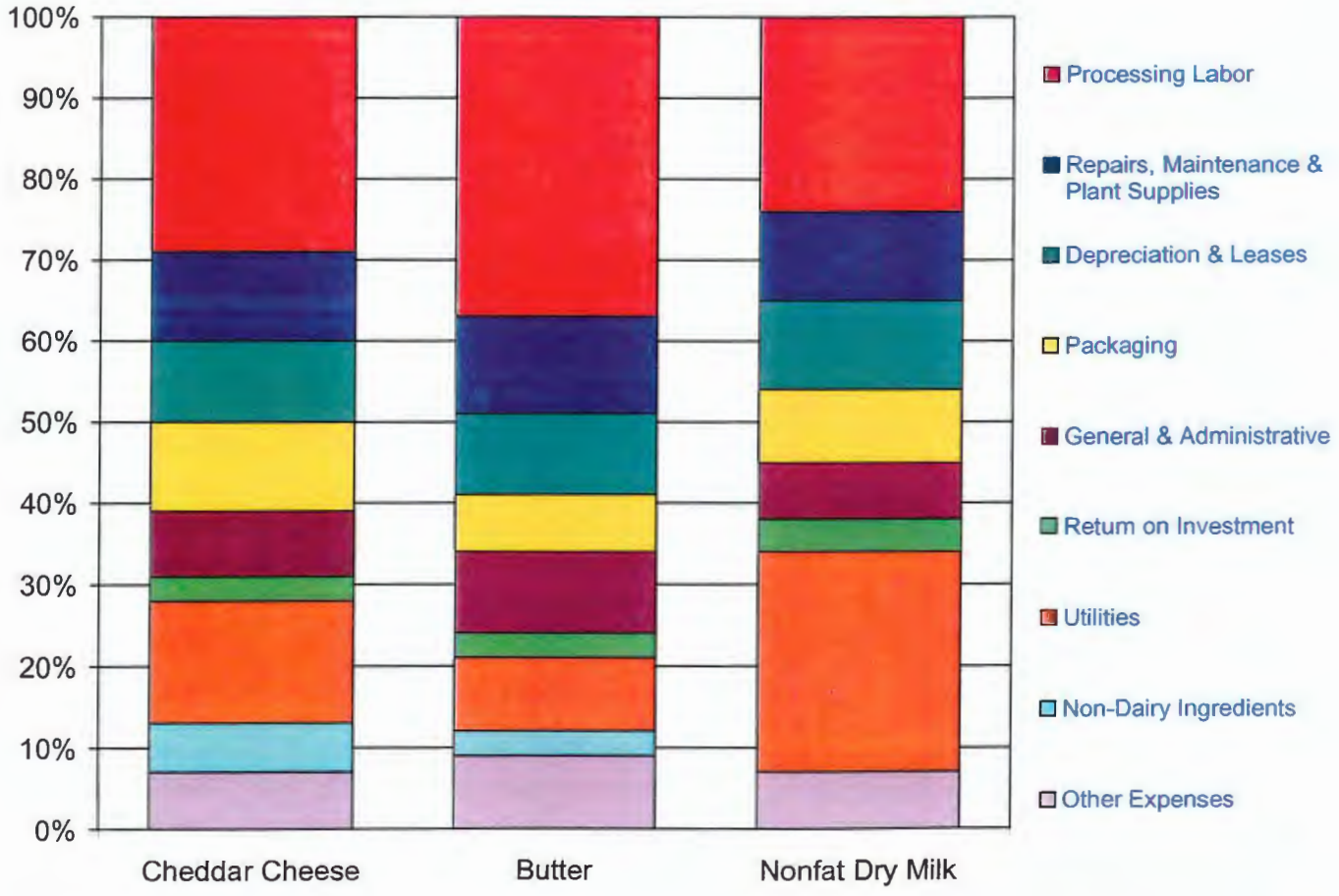
Each plant in the study gave access to cost data for a 12-month period during the study period January 2003 to December 2003. The 2003 cost studies included 7 butter plants, 10 NFDM plants, 9 Cheddar cheese plants, 9 condensed skim plants, and 9 cream plants. Most of these plants processed more than one of the aforementioned products. For these cost studies, the butter plants accounted for 99.9 percent of the butter produced in California. Similarly, the NFDM plants accounted for 100 percent of the NFDM produced in California, and Cheddar cheese plants accounted for 98.4 percent of the Cheddar and Monterey Jack cheese produced in California. Since about half of the plants process and sell bulk cream and/or condensed skim, data was also accumulated for these products.

Labor Was the Largest Cost Component

The predominant category contributing to overall processing costs for any of the three types of studies was labor (Figure 1). Labor contributed an average of 36 percent to total butter processing costs, 23 percent of NFDM processing costs and 29 percent of Cheddar cheese processing costs. The dollar impact of other cost categories varied by product type. Utility costs accounted for 27 percent of NFDM processing costs but only 9 percent of butter processing costs and 15 percent of Cheddar cheese processing costs. Depreciation and lease expenses also showed variability among plant types – 10 percent for Cheddar cheese plants, 10 percent for butter plants, and 11 percent for NFDM plants. The difference in cost structures appears to be attributable, in part, to differences in type of plant ownership. The majority of the butter and NFDM plants (but only about half of the Cheddar cheese plants) are operated by farmer-owned cooperatives.

This publication is divided into sections by product, e.g., Cheddar cheese, butter, and NFDM. Each section includes a summary table which describes categorized processing costs. Bar charts identify the distribution of costs among the study plants. Pie charts detail the overall contribution of individual cost categories to the overall cost structure. This issue of the Manufacturing Cost Annual also contains some general information on cream and condensed skim milk.

Figure 1. Comparison of Costs by Category for California Manufacturing Plants



Cheese Study

Cost studies were completed on nine cheese plants for 2003. Each plant was assigned to one of three groups based on the plant's total processing cost. While costs were calculated based on 40 lb. blocks of Cheddar cheese only, the plants typically manufactured other cheese products and a variety of whey by-products (Figure 2). Cost summary statistics based on the plants in the study provide a quantitative profile of California Cheddar cheese plants, including production capacity, per pound processing costs, and cheese vat information (Tables 1 and 2).

- The data indicated that the lower cost Cheddar plants in the state tended to be the larger plants. Specifically, the three low cost plants produced 61 percent of the Cheddar and Jack cheese in 2003.

- Among the three cost groupings, labor cost was the single largest category that determined manufacturing cost. Processing labor costs ranged from 4.2¢ per pound in the low cost group to 5.3¢ per pound in the medium cost group, and was 9.5¢ per pound in the high cost group.

- Processing non-labor costs as a group were larger than labor cost but included several different plant expenses, such as utilities, depreciation, repairs and maintenance, laundry, supplies and plant insurance. Interestingly, the costs were similar in all three groups. Processing non-labor costs ranged from 7.0¢ per pound in the low cost group to 7.3¢ per pound in the medium cost group, and was 7.9¢ per pound in the high cost group.

- The return on investment (ROI) allowance is calculated by subtracting accumulated depreciation from the original cost of the assets. The remaining book value is multiplied by the average Prime Interest Rate. Those amounts are then allocated to the products in the plant based on the same methods used to allocate the depreciation expense.

- The ROI allowance is an opportunity cost and represents how much interest the company could have earned if its capital was not tied up in land, buildings and equipment. In other words, it is viewed as an alternative source of income had the company invested the capital elsewhere. A higher ROI cost suggests that a plant is relatively new with little accumulated depreciation of its assets (high book value) or that an established plant has low production volume such that the ROI cost has a larger impact than plants with more production volume, all other factors being equal.

- Packaging costs only showed variation comparing the high cost group (2.4¢ per pound) with the low cost (1.8¢ per pound) and medium cost (2.0¢ per pound) groups. Surprisingly, general and administrative costs had the highest costs in the medium cost group.

- Only small differences among cheese making parameters were evident when using the three cost groups (Table 2).

Table 1. Processing Costs for Nine California Cheddar Cheese Plants

1. Manufacturing cost data were collected and summarized from nine California cheese plants. The nine plants processed 756.6 million pounds of cheese during the study period, representing 99.6% of the Cheddar and Monterey Jack cheese processed in California.

2. The processing costs summarized in this study were incurred during a 12-month period, starting in January 2003 and concluding in December 2003.

3. The "Processing Non-Labor" category includes costs such as utilities, repairs and maintenance, supplies, depreciation and rent.

4. The volume total includes both Cheddar and Monterey Jack cheeses, but the costs reflect only costs for 40 lb. blocks of Cheddar.

5. Three plants processed 500-lb. barrels or 640-lb. blocks. Packaging costs and packaging labor for 40 lb. blocks were substituted for these plants.

6. To obtain the weighted average, individual plant costs were weighted by their cheese processing volume relative to the total volume of cheese processed by all plants involved in the cost study.

7. The current manufacturing cost allowance for cheese is $0.175 per pound. About 79% of the cheese was processed at a cost less than the manufacturing cost allowance.

8. The weighted average yield was 10.92 lbs. of cheese per hundredweight of milk. The weighted average moisture was 37.12%, and weighted average vat tests were 3.94% fat and 8.95% SNF.

Cost Groups	Number of Plants	Processing Labor	Processing Non-Labor	Package	Other Ingredient	General & Administrative	Return on Investment	Total Cost	Volume in Group
		dollars per pound of cheese							
Low Cost	3	$0.0415	$0.0730	$0.0176	$0.0106	$0.0129	$0.0058	$0.1614	456,564,540
Medium Cost	3	$0.0526	$0.0695	$0.0203	$0.0112	$0.0170	$0.0038	$0.1744	236,205,739
High Cost	3	$0.0951	$0.0793	$0.0237	$0.0101	$0.0128	$0.0046	$0.2256	61,454,679
Summary Statistics									
Weighted Average		**$0.0493**	**$0.0724**	**$0.0189**	**$0.0107**	**$0.0142**	**$0.0051**	**$0.1706**	
Range Minimum		$0.0377	$0.0524	$0.0141	$0.0066	$0.0076	$0.0022		
Range Maximum		$0.1313	$0.1269	$0.0267	$0.0224	$0.0215	$0.0079		
Total									**756,564,961**

Table 2. Cheddar Cheese Production Parameters from Cost Studies[1]

Cost Group	Finished Moisture %	Vat Fat Test %	Vat SNF Test %	Vat Yield %
Low	36.36	3.65	8.97	10.22
Medium	37.95	4.15	9.04	10.93
High	42.26	3.74	8.75	11.91
Wt'd Avg.	**38.22**	**3.87**	**8.92**	**11.05**

[1] Moisture, vat tests and yields reflect levels achieved for Cheddar cheese only.

Characteristics of Cheddar Cheese Plants

While the summary analyses of the cost studies that have been published historically have provided many insights into Cheddar cheese operations in California, they do not address some of the most basic features of the plants and how different costs compare among the plants in the study. In the following section, summary statistics are provided to indicate how much variation exists among cheese plants. The "weighted average" is weighted by pounds of cheese produced. The "median" is the midpoint in the data and indicates the point at which half of the plants are above and half of the plants are below the given figure.

Throughout this section, column charts are used to show the distribution of the plants within a specified category or the breakdown of costs by category. The charts give an indication of how much variation exists among the plants and the relative impact of individual cost categories.

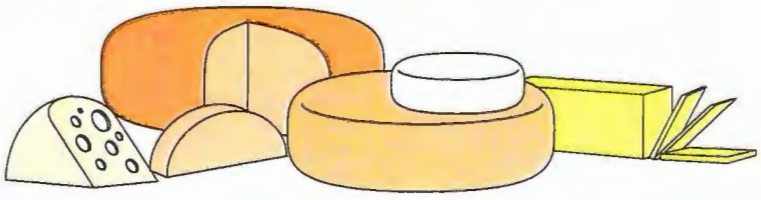


Figure 2. Simplified Product Flow in a Cheese Plant with By-Product Processing

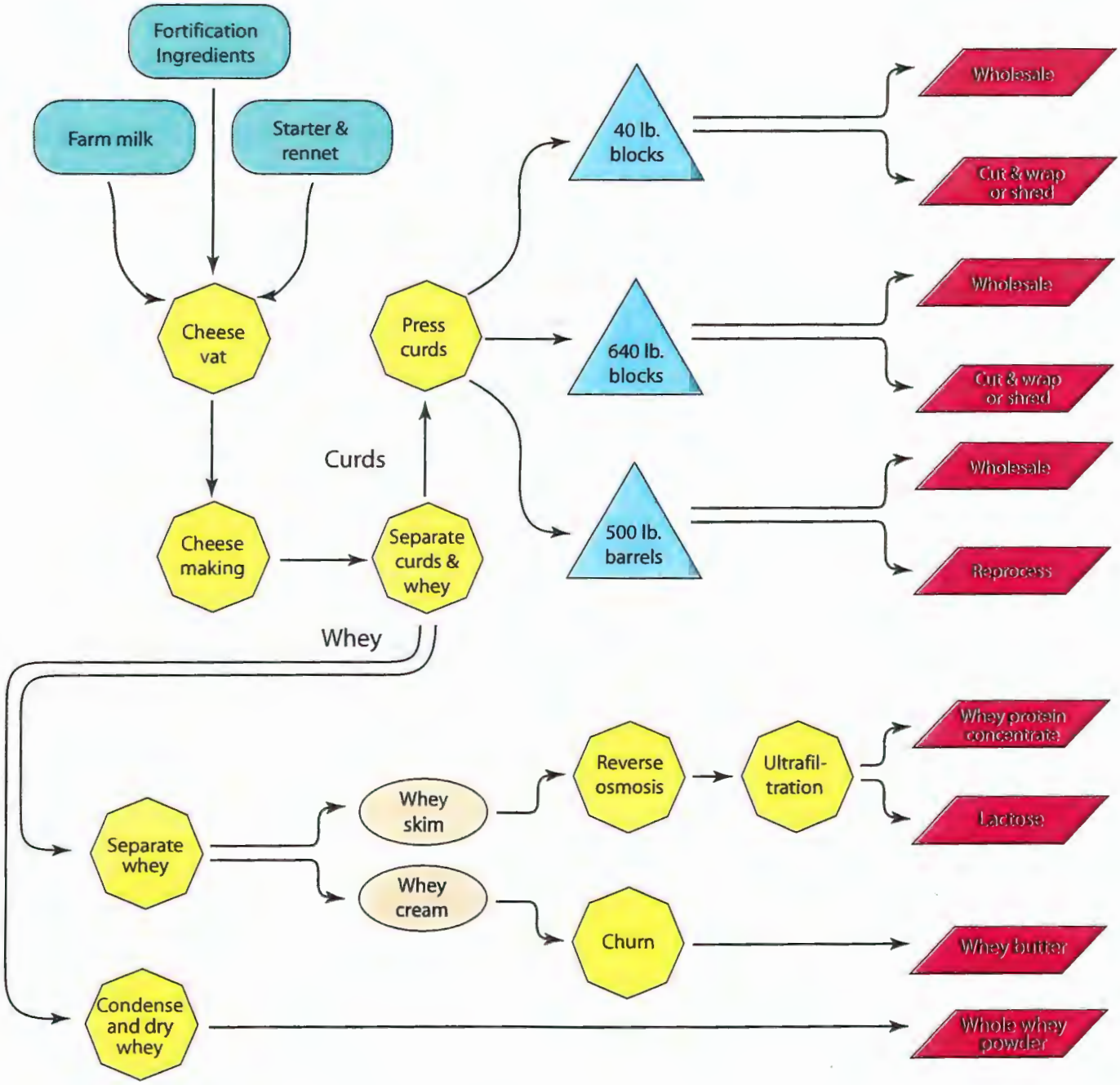


Figure 3. Breakdown of Cheddar Cheese Processing Costs

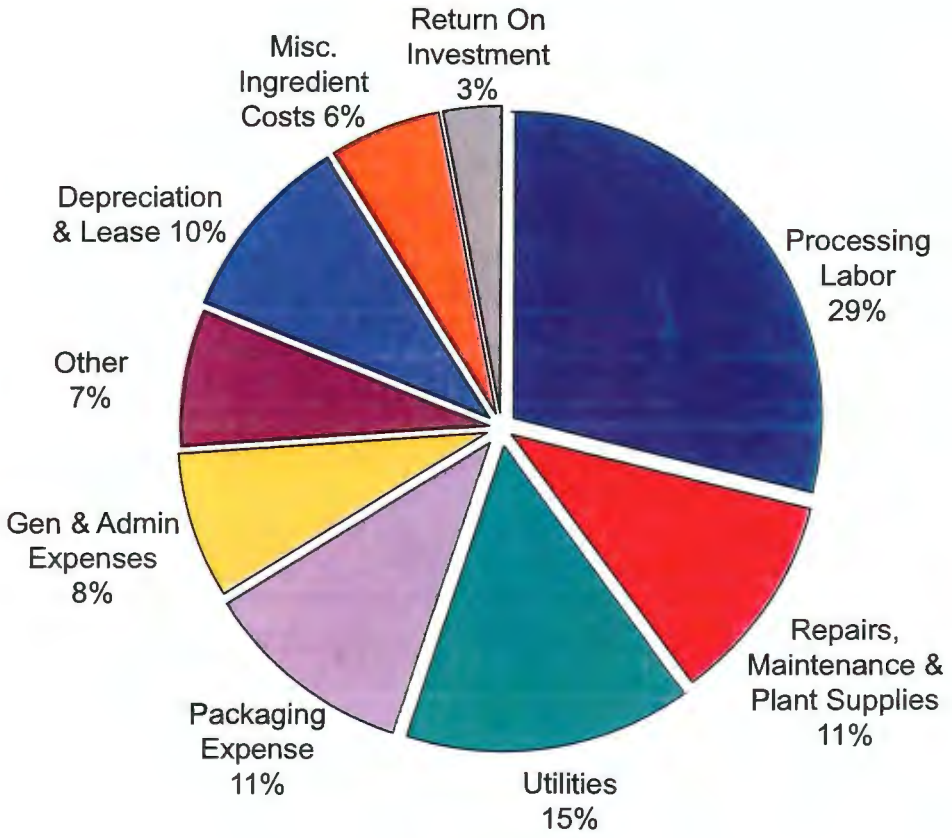


Figure 4. Breakdown of Cheddar Cheese Packaging Sizes

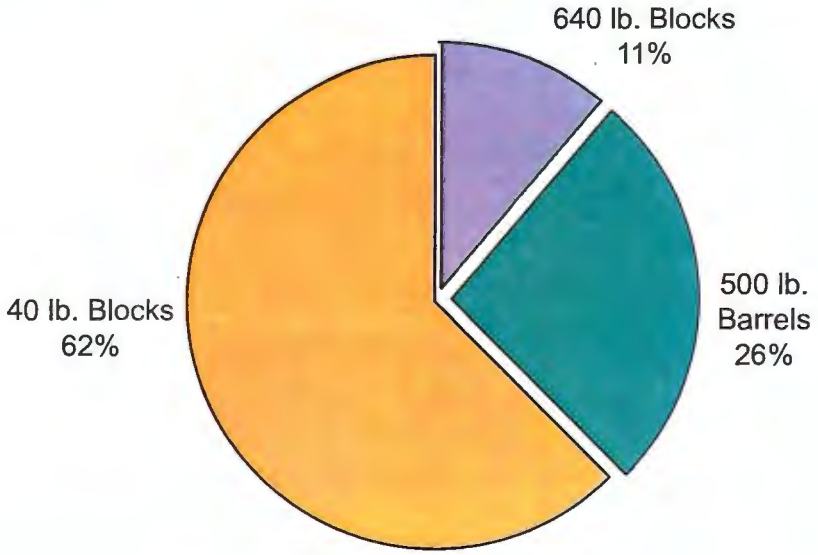
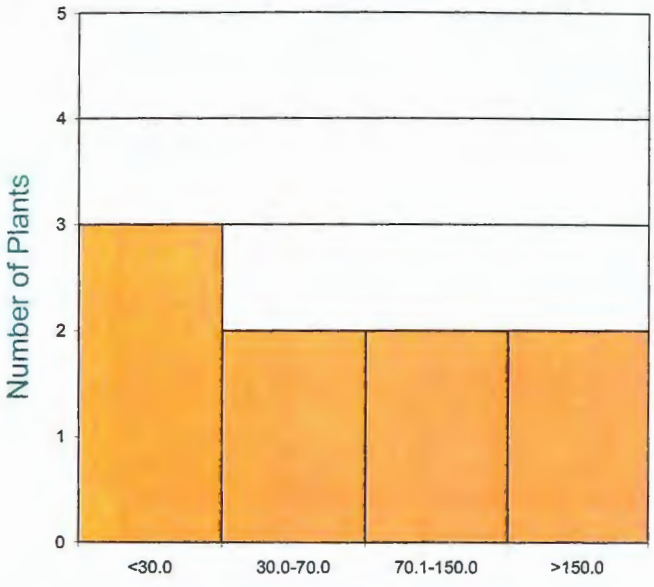


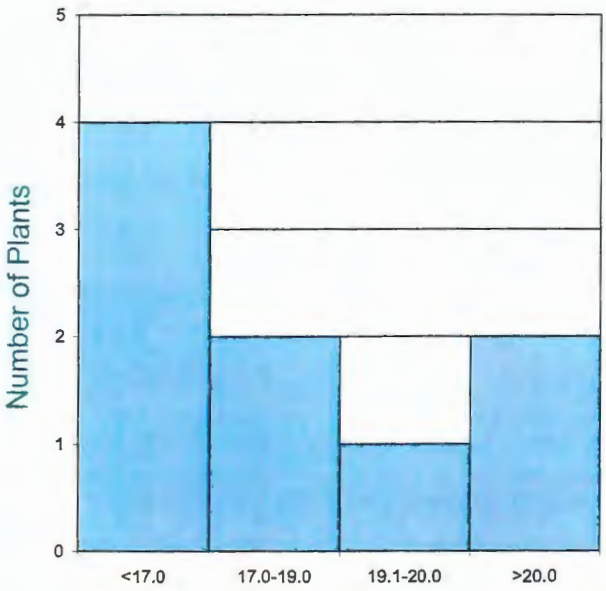
Figure 5. Annual California Cheddar and Jack Cheese Production



Average	=	84 million pounds
Median	=	47 million pounds
Average of low 3	=	19 million pounds
Average of high 3	=	184 million pounds

- Two plants produced over 150 million pounds.
- Three of the nine plants produced less than 30 million pounds.
- Cheese plants are predominantely located in high milk producing counties.

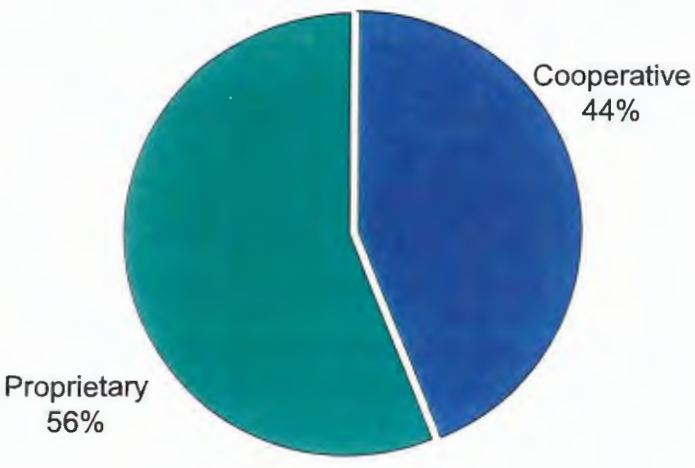
Figure 6. Manufacturing Cost per Pound



Average	=	19.4¢ per pound
Wt'd Average	=	17.0¢ per pound
Median	=	18.2¢ per pound
Average of low 3	=	16.2¢ per pound
Average of high 3	=	24.3¢ per pound

- In general, larger plants had lower costs per pound than smaller plants.
- Cost per pound ranged from 16¢ per pound to greater than 25¢ per pound.
- Four plants had costs per pound of less than 17¢ per pound.

Figure 7. Share of California Cheddar and Jack Cheese Production by Ownership Type and by Workforce Type



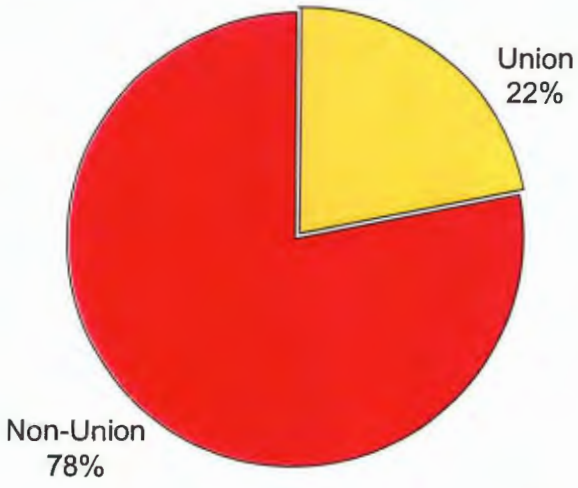
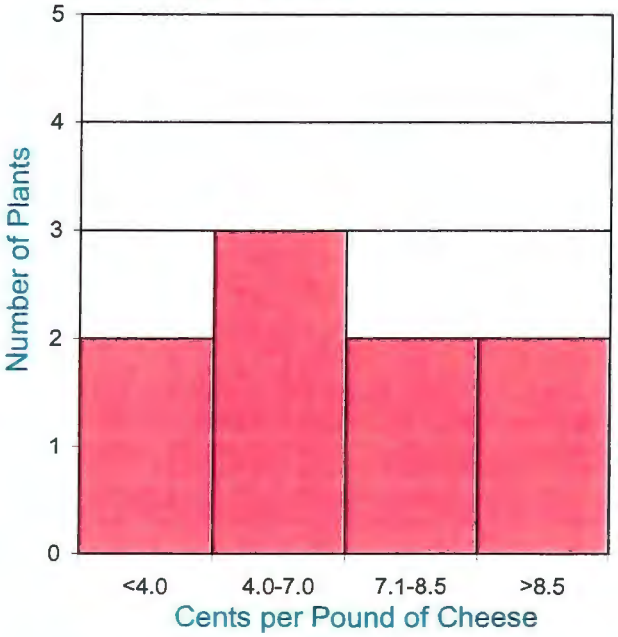


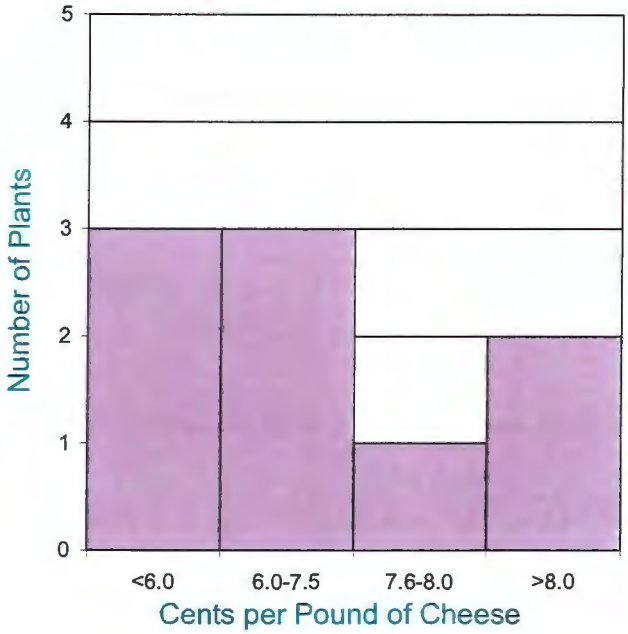
Figure 8. Processing Labor Cost per Pound



Average	=	6.8¢ per pound
Wt'd Average	=	4.9¢ per pound
Median	=	6.6¢ per pound
Average of low 3	=	4.1¢ per pound
Average of high 3	=	10.1¢ per pound

- Three plants had labor costs ranging from 4¢ to 7¢ per pound.
- The average labor cost per pound for the high 3 plants was 150% higher than the average labor cost for the low 3 plants.
- Simple average labor cost was 6.8¢ whereas the weighted average cost based on production volume was 4.9¢ indicating a lower cost, generally, for larger plants.

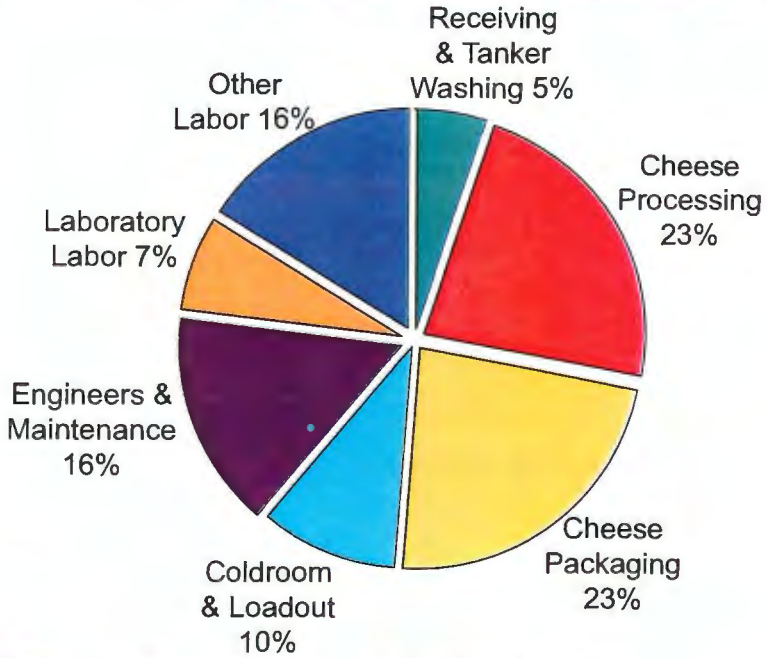
Figure 9. Processing Non-Labor Cost per Pound



Average	=	7.3¢ per pound
Wt'd Average	=	7.2¢ per pound
Median	=	7.1¢ per pound
Average of low 3	=	5.3¢ per pound
Average of high 3	=	9.5¢ per pound

- Includes utilities, depreciation, repairs and maintenance, laundry, supplies, and plant insurance.
- Three plants had non-labor costs of less than 6¢; two plants had non-labor costs of more than 8¢; and the remaining four plants ranged from 6¢ to 8¢ per pound.

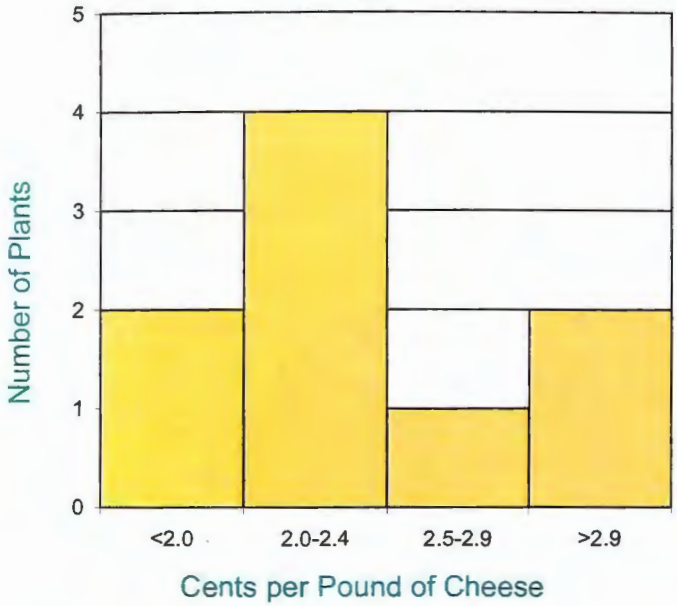
Figure 10. Cheddar Cheese Labor Breakdown by Category



Based on detailed data:
Labor cost averaged 5¢ per pound
Labor cost averaged $1.98 per 40 lb. block

Note: "Other" includes pasteurizing, separating, plant manager/superintendent, general plant, plant clerical, and whey disposal.

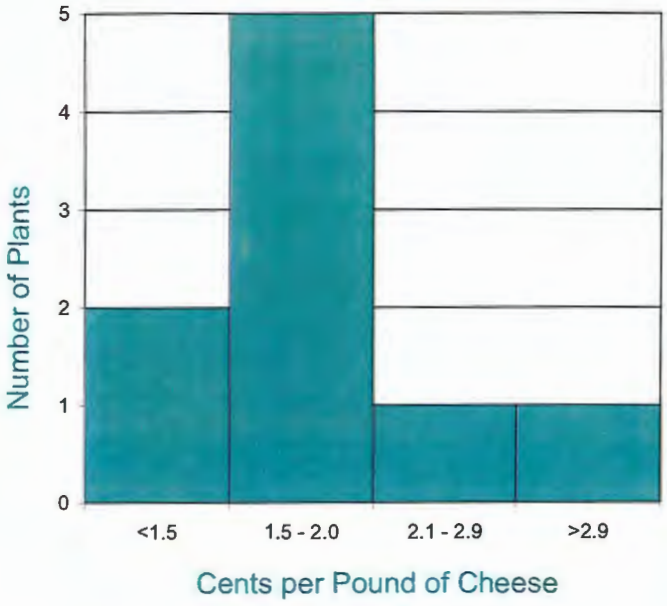
Figure 11. Utility Cost per Pound



Average	=	2.4¢ per pound
Wt'd Average	=	2.5¢ per pound
Median	=	2.3¢ per pound
Average of low 3	=	1.9¢ per pound
Average of high 3	=	2.9¢ per pound

- Utility costs ranged from 1.7¢ to 3.1¢ per pound.
- The average utility cost per pound for the high 3 plants was 56% more than that of the average utility cost for the low 3 plants.
- Electricity represents 40% of the utility cost while natural gas represents approximately 32%. Sewage, water, and whey disposal make up 28% of the total cost.

Figure 12. Repairs, Maintenance, and Supplies Cost per Pound



Average	=	2.2¢ per pound
Wt'd Average	=	1.9¢ per pound
Median	=	1.8¢ per pound
Average of low 3	=	1.5¢ per pound
Average of high 3	=	3.2¢ per pound

- Repairs and maintenance represent approximately 58% of the costs incurred in this category; and supplies represent 42%.
- Older plants tended to have higher per pound repair and maintenance costs.
- Repair and maintenance cost per pound of cheese ranged from less than 1.5¢ to more than 3¢ per pound. The weighted average repair and maintenance cost per pound of cheese was 1.9¢.

Figure 13: Comparison of Payroll Breakdown for Plant Employees, Hourly and Salaried

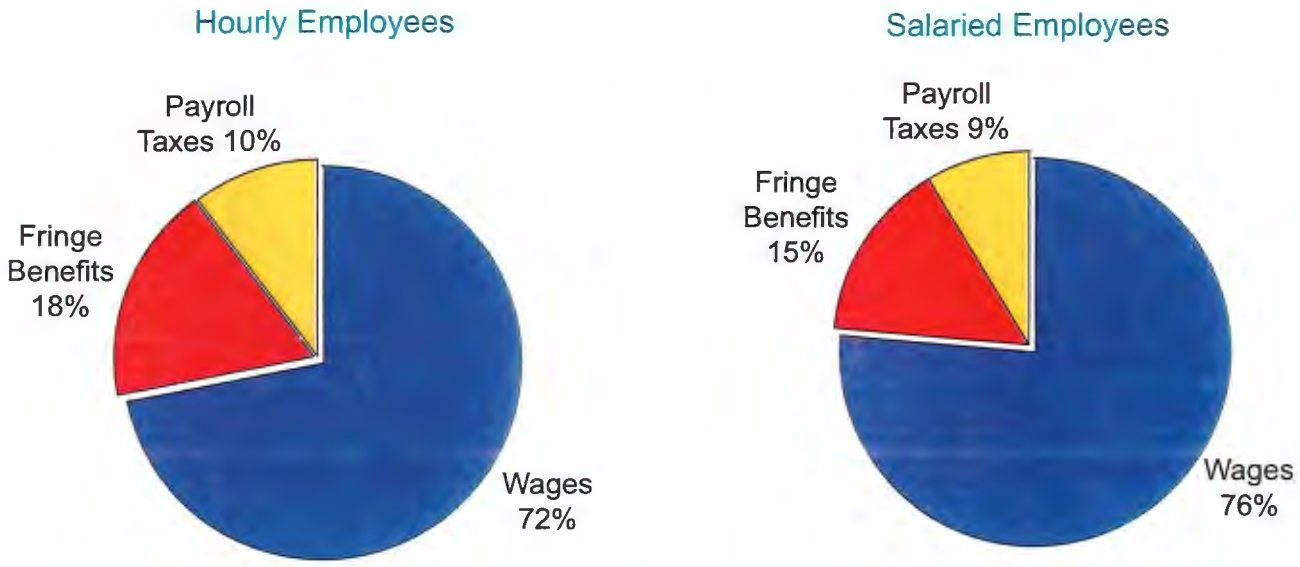
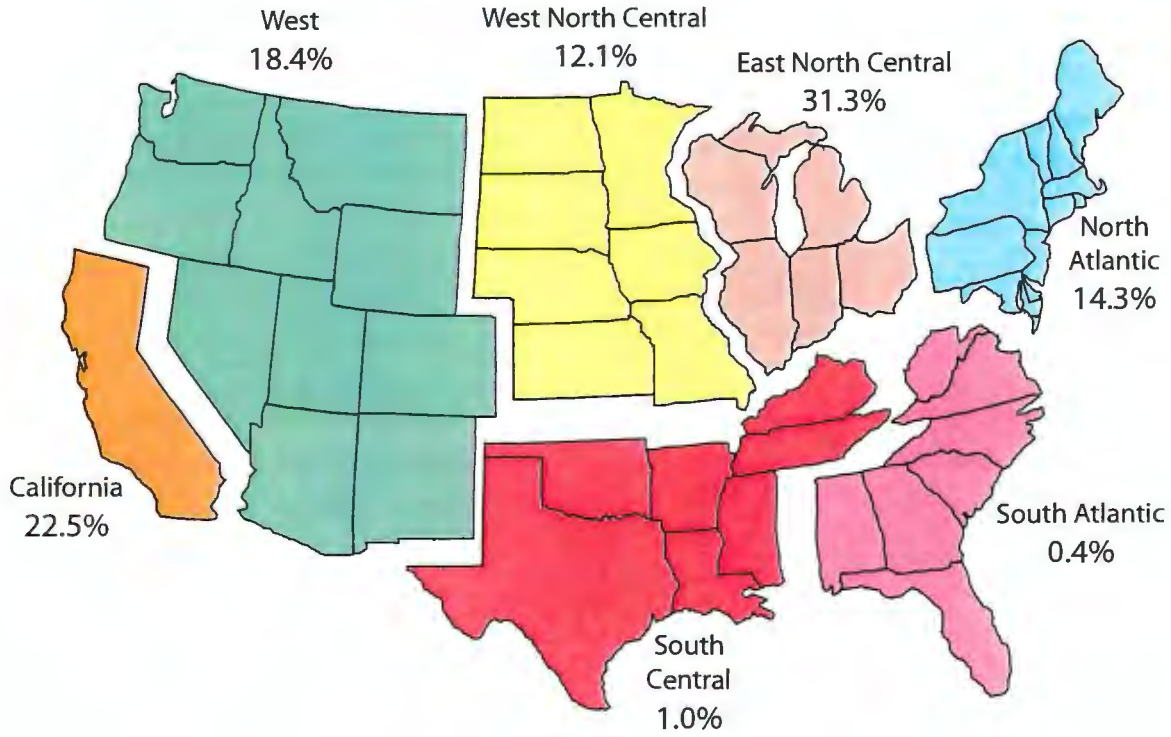


Figure 14. Share of Cheese Production by Region, 2004



Butter Study

Cost studies were completed on seven butter plants for 2003. Plant cost summary statistics based on the study plants give an indication of plant size and per pound processing costs for various categories (Table 3). To avoid revealing plant-specific information, the seven plants were assigned to one of two groups according to total processing cost. Only costs for bulk butter (25 kg and 68 lb. boxes) were analyzed although most plants produced a variety of other sizes (Figures 16 and 17).

- The data indicated that the lower cost butter plants in the state tended to be plants with larger production volumes. Specifically, the four low cost plants produced 59 percent of the butter in California during 2003.

- Between the two cost groupings, labor cost was the single largest item that determined manufacturing cost. Processing labor ranged from a weighted average of 4.0¢ per pound in the low cost group to a weighted average of 5.8¢ per pound in the high cost group, a 45 percent difference.

- Processing non-labor cost as a group was larger than labor cost but included several different plant expenses, such as utilities, depreciation, repairs and maintenance, laundry, supplies and plant insurance. These costs ranged from 4.1¢ per pound to 6.7¢ per pound, a 63 percent difference.

- The return on investment (ROI) allowance is calculated by subtracting accumulated depreciation from the original cost of assets. The remaining book value is multiplied by the yearly average Prime Interest Rate. Those amounts are then allocated to the products in the plant based on the same methods used to allocate the depreciation expense. In these butter studies, ROI is 114% higher for the high cost plants due to less volume or the age of the plant.

- Packaging costs showed little variation among the two cost groups, but general and administrative costs were 54% higher for the high cost group.

Table 3. Processing Costs for Seven California Butter Plants

1. Manufacturing cost data were collected and summarized from seven California butter plants. The seven plants processed 362.4 million pounds of butter during the study period, representing 99.8% of the butter processed in California.

2. The processing costs summarized in this study were incurred during a 12-month period, starting in January 2003 and concluding in December 2003.

3. The "Processing Non-Labor" category includes costs such as utilities, repairs and maintenance, supplies, depreciation and rent.

4. The volume total includes both bulk butter and cut butter, but the costs reflect only costs for bulk butter (25 kg and 68 lb. blocks).

5. To obtain the weighted average, individual plant costs were weighted by their butter processing volume relative to the total volume of butter processed by all plants involved in the cost study.

6. The current manufacturing cost allowance for butter is $0.132 per pound. About 59% of the butter was processed at a cost less than the manufacturing cost allowance.

Cost Groups	Number of Plants	Processing Labor	Processing Non-Labor	Package	Other Ingredient	General & Administrative	Return on Investment	Total Cost	Volume in Group
		dollars per pound of butter							
Low Cost	4	$0.0400	$0.0406	$0.0090	$0.0025	$0.0115	$0.0029	$0.1065	215,142,837
High Cost	3	$0.0582	$0.0668	$0.0089	$0.0064	$0.0177	$0.0062	$0.1642	147,243,710
Summary Statistics									
Weighted Average		**$0.0474**	**$0.0512**	**$0.0090**	**$0.0041**	**$0.0140**	**$0.0042**	**$0.1299**	
Range Minimum		$0.0345	$0.0366	$0.0062	$0.0015	$0.0065	$0.0025		
Range Maximum		$0.1583	$0.1031	$0.0105	$0.0089	$0.0606	$0.0067		
Total									**362,386,547**

Characteristics of Butter Plants

While the summary analyses of the cost studies that have been published historically have provided many insights into butter processing plants in California, they do not address some of the most basic features of the plants and how different costs compare among the plants in the study. In the following section, summary statistics are provided to indicate how much variation exists among butter plants. The "weighted average" is based on pounds of butter produced. The "median" indicates the point at which half of the plants are above and half of the plants are below the given figure.

Throughout this section, column charts are used to show the distribution of plants within a specified category or the breakdown of costs by category. The graphs give an indication of how much variation exists among the plants and the relative impact of individual cost categories.

Figure 15. Simplified Flowchart of a Butter and Nonfat Dry Milk Plant

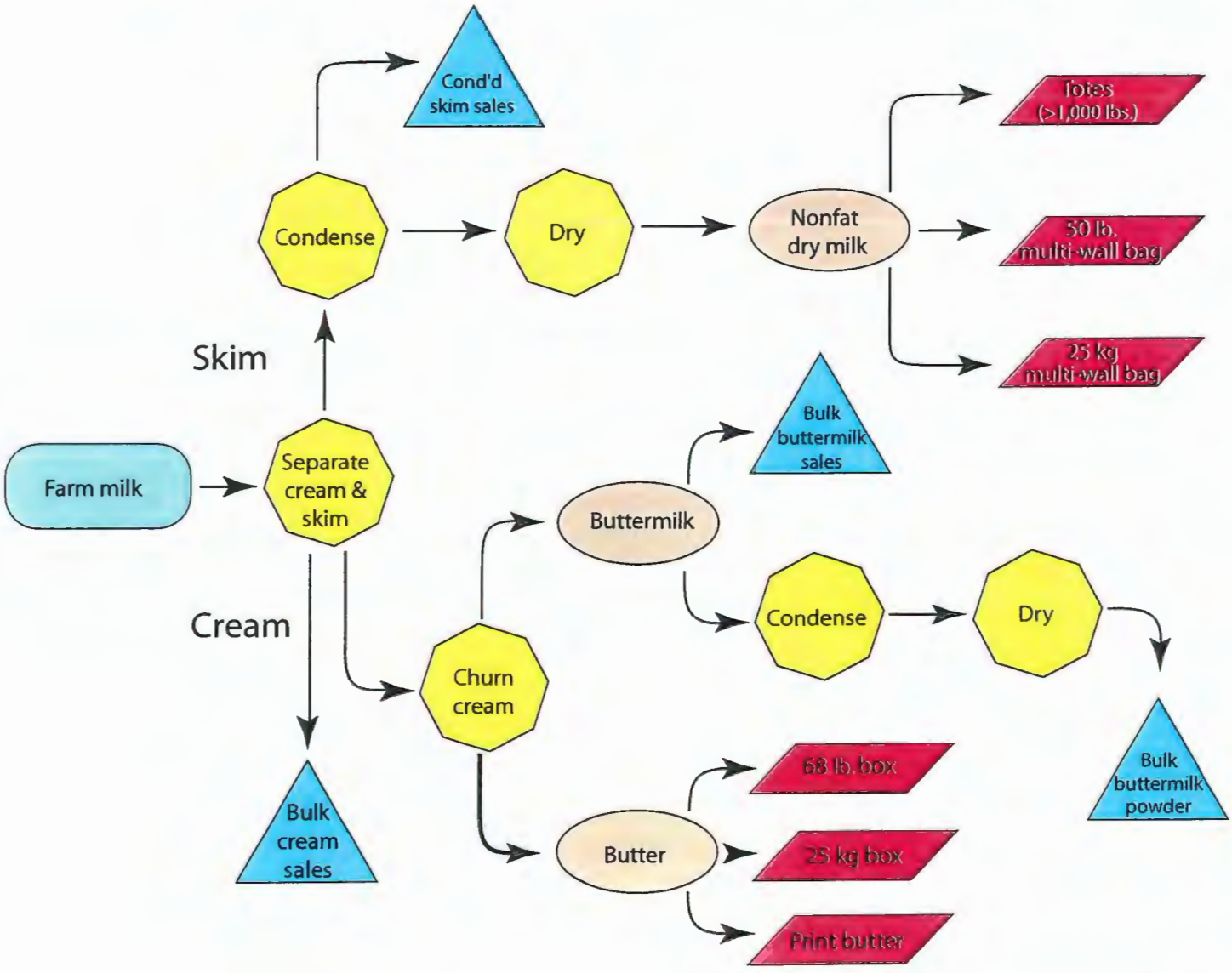


Figure 16. Breakdown of Butter Processing Costs

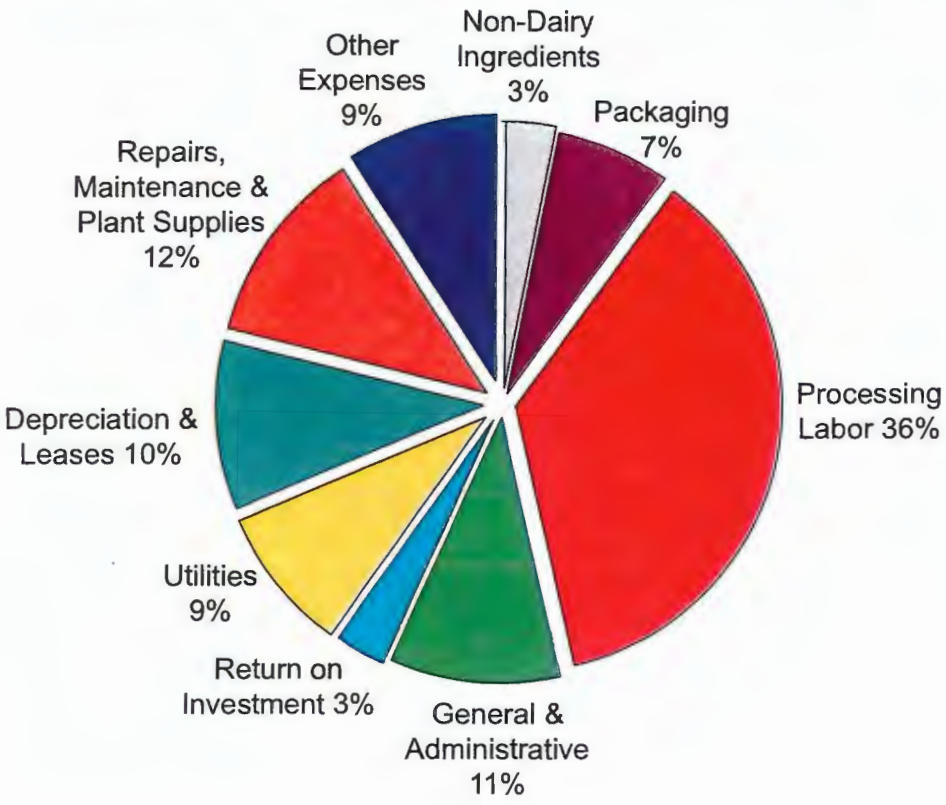


Figure 17. Breakdown of Butter Packaging Sizes and Types

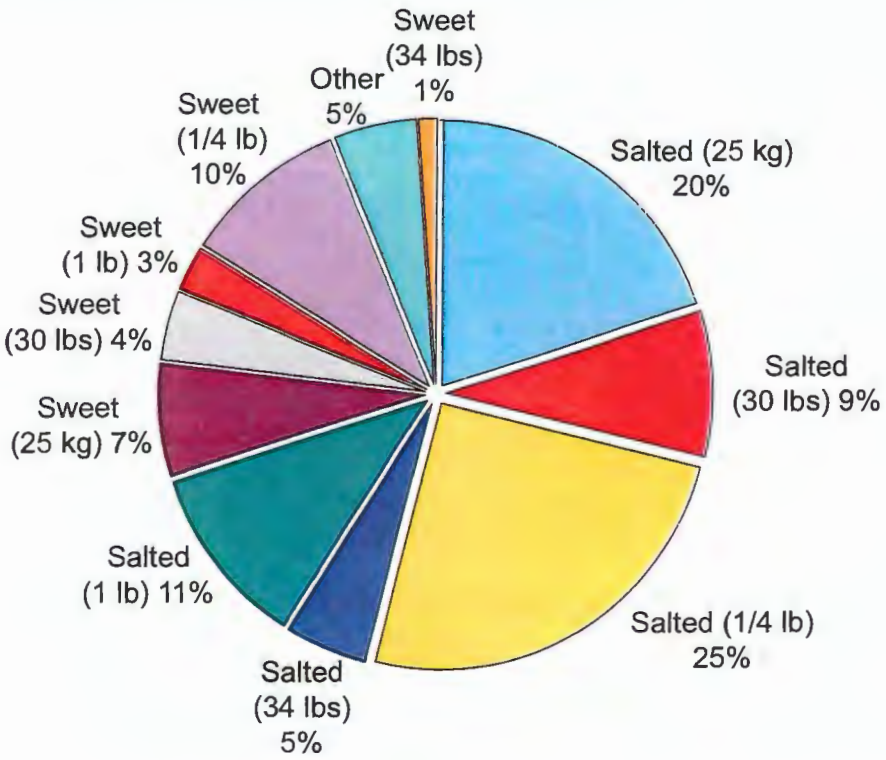
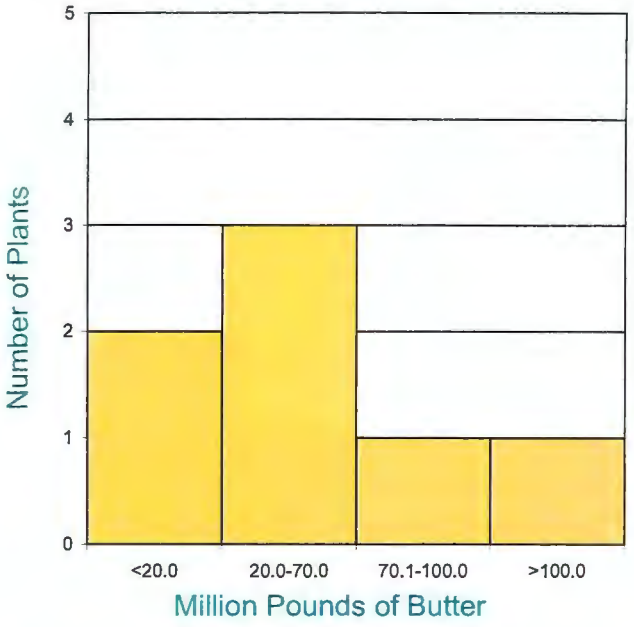


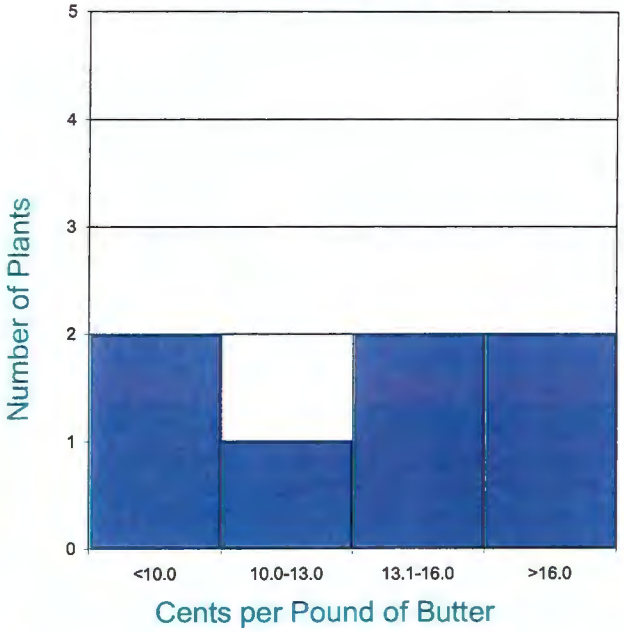
Figure 18. Annual California Butter Production



Average	=	52 million pounds
Median	=	31 million pounds
Average of low 3	=	18 million pounds
Average of high 3	=	93 million pounds

- The 3 largest plants produced 5.2 times more butter than the 3 smallest plants.
- Butter plants tended to be located near milk supplies and not in or near large metropolitan centers.

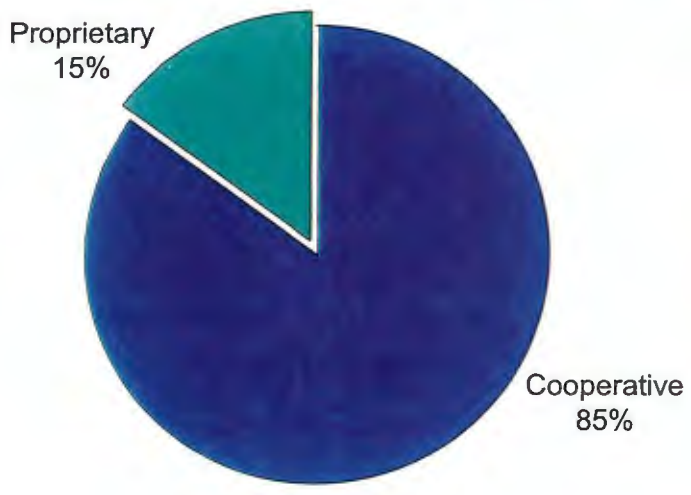
Figure 19. Butter Manufacturing Cost per Pound



Average	=	16.2¢ per pound
Wt'd Average	=	13.0¢ per pound
Median	=	15.3¢ per pound
Average of low 3	=	10.9¢ per pound
Average of high 3	=	21.9¢ per pound

- Two of the plants produced butter for less than 13¢ per pound.
- In general, larger butter plants tended to have lower per unit butter production costs than smaller plants.
- Plants with higher total processing costs also had higher labor costs.
- The average cost per pound of the high cost plants was 101% higher than that of the low cost plants.

Figure 20. Share of California Butter Production by Ownership Type and by Workforce Type



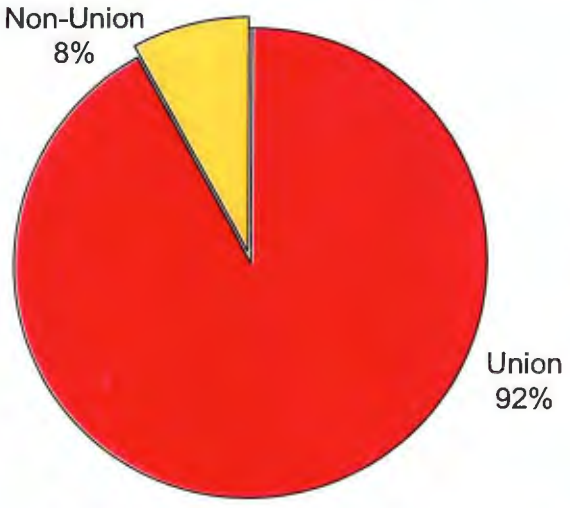
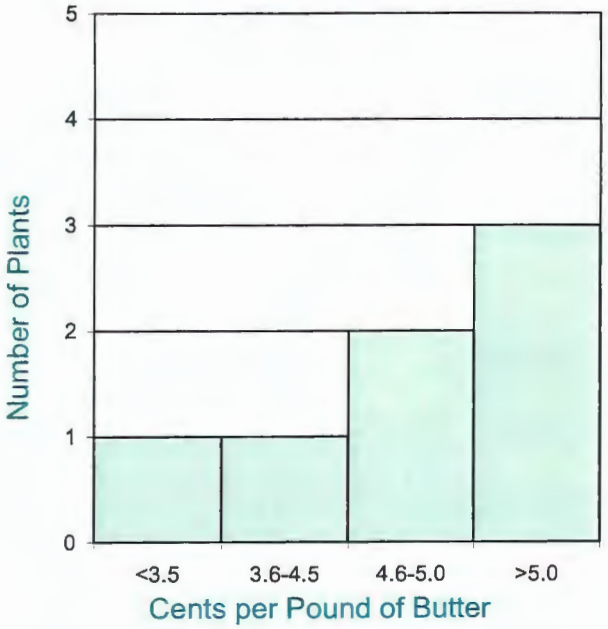


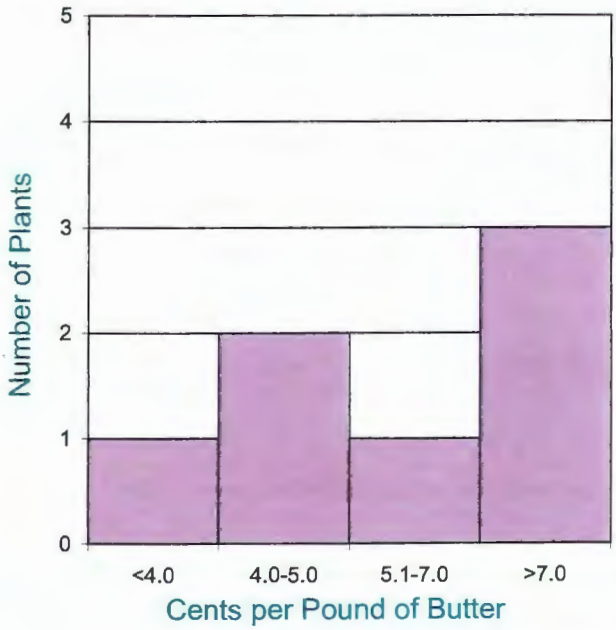
Figure 21. Processing Labor Cost per Pound



Average	=	6.2¢ per pound
Wt'd Average	=	4.7¢ per pound
Median	=	5.0¢ per pound
Average of low 3	=	3.9¢ per pound
Average of high 3	=	8.9¢ per pound

- Five plants had labor costs greater than 4.5¢ per pound.
- The average labor cost per pound for the high 3 plants was 128% higher than the average labor cost for the low 3 plants.

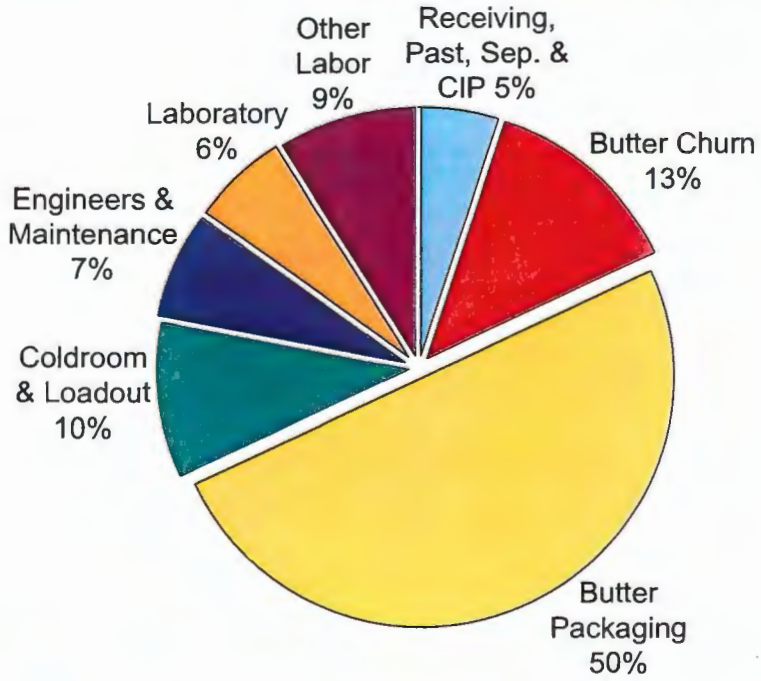
Figure 22. Processing Non-Labor Cost per Pound



Average	=	6.4¢ per pound
Wt'd Average	=	5.1¢ per pound
Median	=	5.9¢ per pound
Average of low 3	=	4.2¢ per pound
Average of high 3	=	8.6¢ per pound

- Processing non-labor costs were more variable than processing labor costs.
- Three of the plants had processing non-labor costs between 4¢ and 7¢ per pound.
- The average non-labor cost per pound for the high 3 plants was 103% higher than the average non-labor cost for the low 3 plants.

Figure 23. Butter Labor Breakdown by Category

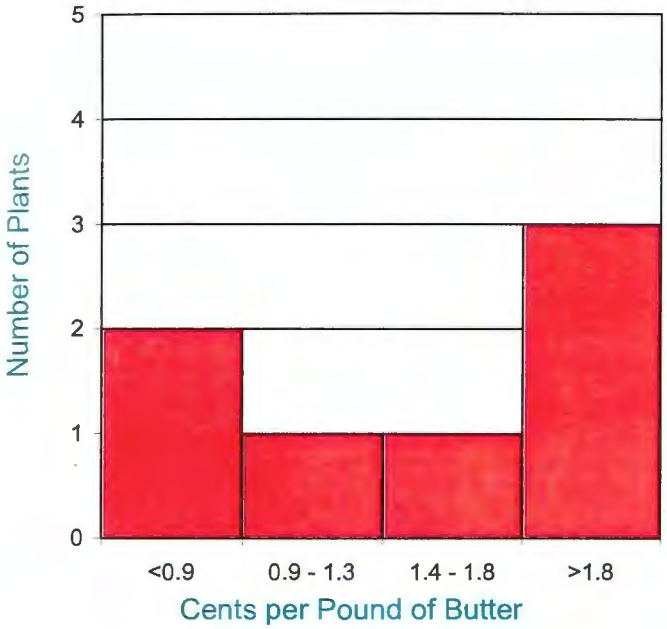


Based on detailed data:
Labor cost averaged 4.7¢ per pound
Labor cost averaged $2.59 per 25 kg box

Note: "Other" includes plant manager/ superintendent, general plant, and plant clerical

Figure 24. Utility Cost per Pound

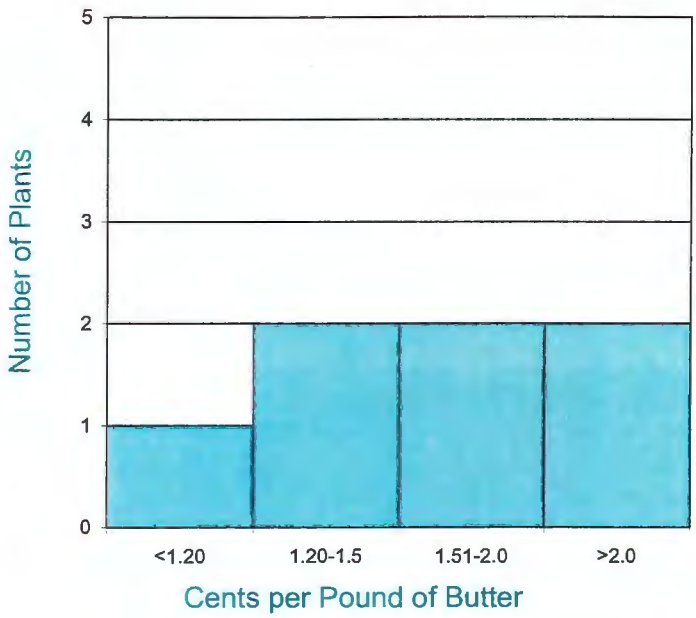
Includes cost of natural gas, fuel oil, electricity, and sewage



Average	=	1.7¢ per pound
Wt'd Average	=	1.2¢ per pound
Median	=	1.6¢ per pound
Average of low 3	=	0.9¢ per pound
Average of high 3	=	2.5¢ per pound

- Utility cost per pound ranged from 0.8¢ to 3.6¢ with three of the plants having costs in excess of 1.7¢ - the average cost per pound.
- The average utility cost per pound for the high 3 plants was 178% higher than the average utility cost for the low 3 plants.
- Water, sewage, and waste disposal costs generally ranged from 6% to 38% of the total cost of utilities.

Figure 25. Repairs, Maintenance, and Supplies Cost per Pound



Average	=	1.9¢ per pound
Wt'd Average	=	1.6¢ per pound
Median	=	1.7¢ per pound
Average of low 3	=	1.4¢ per pound
Average of high 3	=	2.4¢ per pound

- Repair, maintenance, and supplies costs per pound ranged from 1.2¢ to 3.4¢ per pound.
- Four plants had costs of more than 1.5¢ per pound.
- Per-pound repairs and maintenance costs were not necessarily lower in the larger plants relative to the smaller plants.

Figure 26: Comparison of Payroll Breakdown for Plant Employees and Salaried Employees

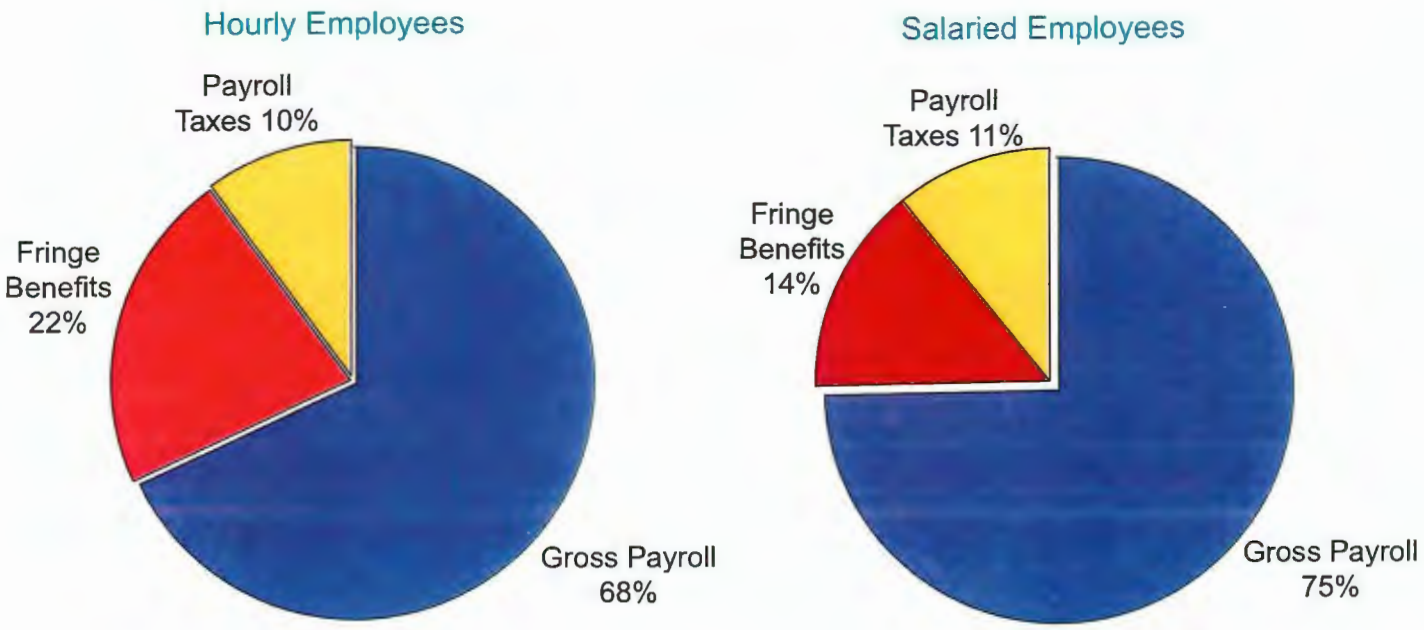
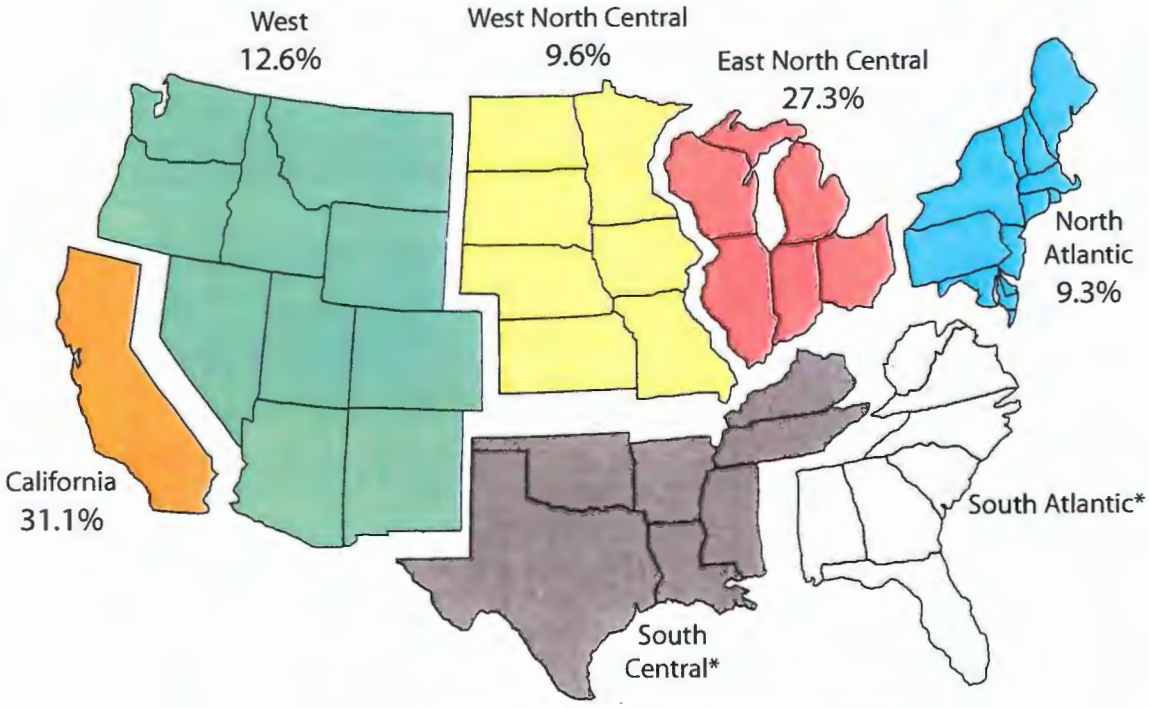


Figure 27. Share of Butter Production by Region, 2004



*Not disclosed for confidentiality reasons.

Nonfat Dry Milk Study

Cost studies were completed on ten nonfat dry milk (NFDM) plants for 2003. Plant cost summary statistics based on the study plants give an indication of plant size and per pound processing costs for various categories (Table 4). To avoid revealing plant-specific information, the ten plants were assigned to one of three groups according to total processing cost. Only costs for bagged NFDM were analyzed although high-volume totes are becoming more common in some plants (Figures 30 and 32).

- The data indicated that the lower cost NFDM plants in the state tended to be the larger plants. Specifically, the four low cost plants in the study produced 67 percent of the NFDM in California during the study period.

- Among the three cost groupings, labor cost was the single largest item that determined NFDM manufacturing cost. Processing labor ranged from a weighted average of 3.2¢ per pound in the low cost group to a weighted average of 7.0¢ per pound in the high cost group, a 3.8¢ difference from the low cost group to the high cost group.

- Processing non-labor costs as a group were larger than labor costs but included several different plant expenses, such as utilities, depreciation, repairs and maintenance, laundry, supplies and plant insurance. These costs ranged from 8.2¢ per pound to 13.2¢ per pound, a 5.0¢ difference from the low cost group to the high cost group.

- The return on investment (ROI) allowance is calculated by subtracting accumulated depreciation from the original cost of assets. The remaining book value is multiplied by the yearly Prime Interest Rate. Those amounts are then allocated to the products in the plant based on the same methods used to allocate the depreciation expense. the ROI costs for NFDM plants are low for all three groups. The weighted average cost for all ten plants is only 0.6¢ per pound. This is mainly due to the low 4.13% prime rate for 2003.

- Packaging costs were lowest for the high cost groups; general and administrative costs were highest for the high cost group.

Table 4. Processing Costs for Ten California Nonfat Dry Milk Plants

1. Manufacturing cost data were collected and summarized from ten California nonfat powder plants. The ten plants processed 739 million pounds of nonfat powder during the study period, representing 100% of the nonfat powder processed in California.

2. The processing costs summarized in this study were incurred during a 12-month period, starting in January 2003 and concluding in December 2003.

3. The "Processing Non-Labor" category includes costs such as utilities, repairs and maintenance, supplies, depreciation and rent.

4. The volume total includes all grades of nonfat powder packaged in any container size, but the costs reflect only costs for 25 kg and 50 lb. bags of nonfat powder.

5. To obtain the weighted average, individual plant costs were weighted by their nonfat powder processing volume relative to the total volume of nonfat powder processed by all plants involved in the cost study.

6. The current manufacturing cost allowance for nonfat powder is $0.15 per pound. About 63% of the nonfat powder was processed at a cost less than the manufacturing cost allowance.

Cost Groups	Number of Plants	Processing Labor	Processing Non-Labor	Package	General & Administrative	Return on Investment	Total Cost	Volume in Group
		dollars per pound of powder						
Low Cost	3	$0.0328	$0.0816	$0.0145	$0.0094	$0.0047	$0.1430	465,947,584
Medium Cost	4	$0.0364	$0.0980	$0.0144	$0.0125	$0.0076	$0.1689	239,070,247
High Cost	3	$0.0699	$0.1316	$0.0122	$0.0195	$0.0085	$0.2417	33,972,103
Summary Statistics								
Weighted Average		**$0.0357**	**$0.0892**	**$0.0144**	**$0.0109**	**$0.0058**	**$0.1560**	
Range Minimum		$0.0279	$0.0752	$0.0106	$0.0068	$0.0028		
Range Maximum		$0.0963	$0.2050	$0.0148	$0.0351	$0.0098		
Total								**738,989,934**

Characteristics of Nonfat Dry Milk Plants

While the summary analyses of the cost studies that have been published historically have provided many insights into NFDM operations in California, they do not address some of the most basic features of the plants and how different costs compare among the plants in the study. In the following section, summary statistics are provided to indicate how much variation exists among NFDM plants. The weighted average is weighted by pounds of NFDM produced. The "median" indicates the point at which half of the plants above and half of the plants are below the given figure.

Throughout this section, column charts are used to show the distribution of plants within a specified category or the breakdown of costs by category. The charts give an indication of how much variation exists among the plants and the relative impact of individual cost categories.

Figure 28. Simplified Flowchart of a Butter and Nonfat Dry Milk Plant

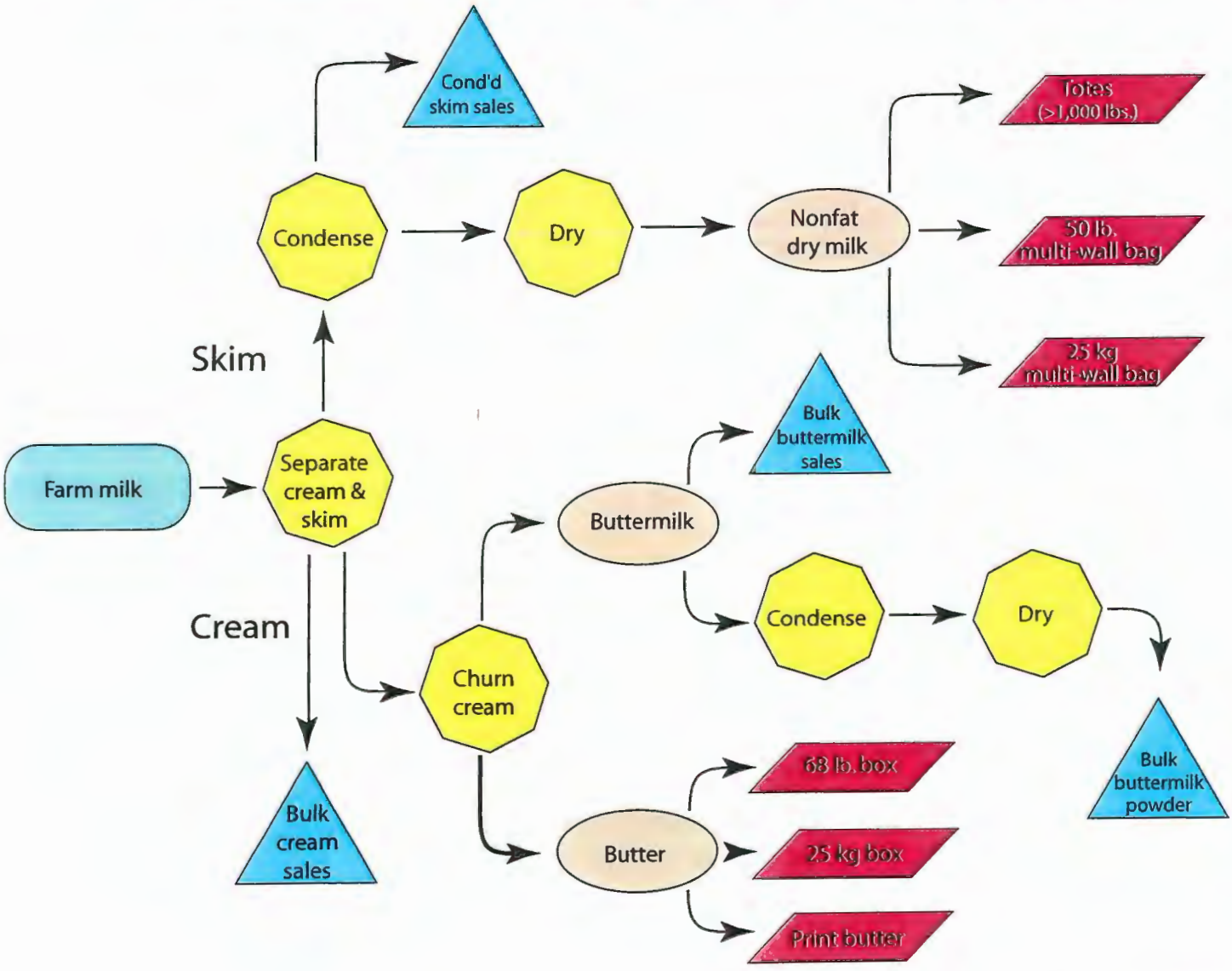


Figure 29. Breakdown of Nonfat Dry Milk Processing Costs

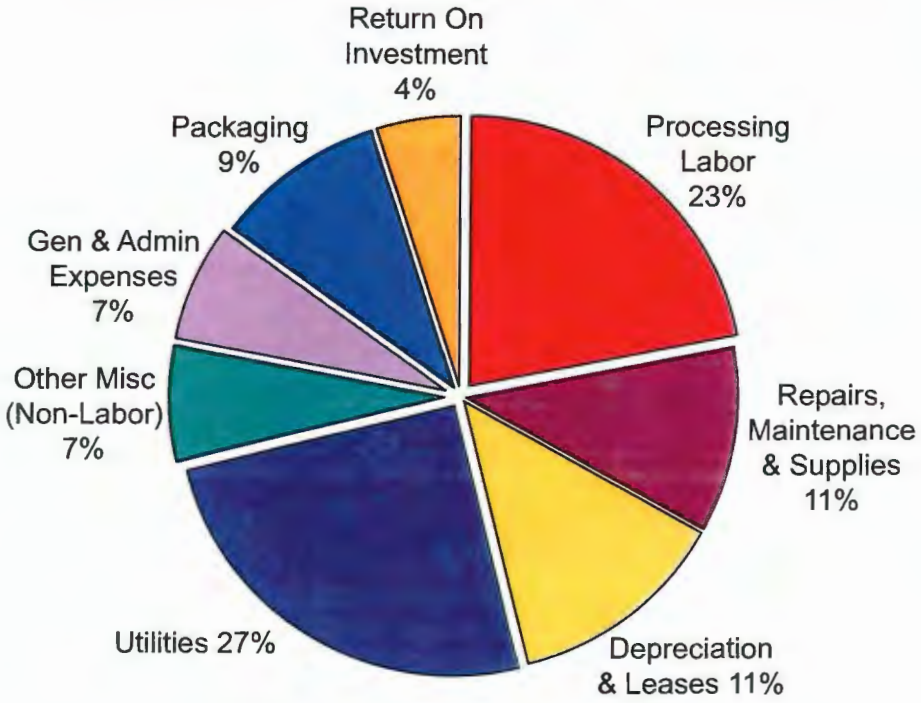


Figure 30. Breakdown of Nonfat Dry Milk Packaging Sizes

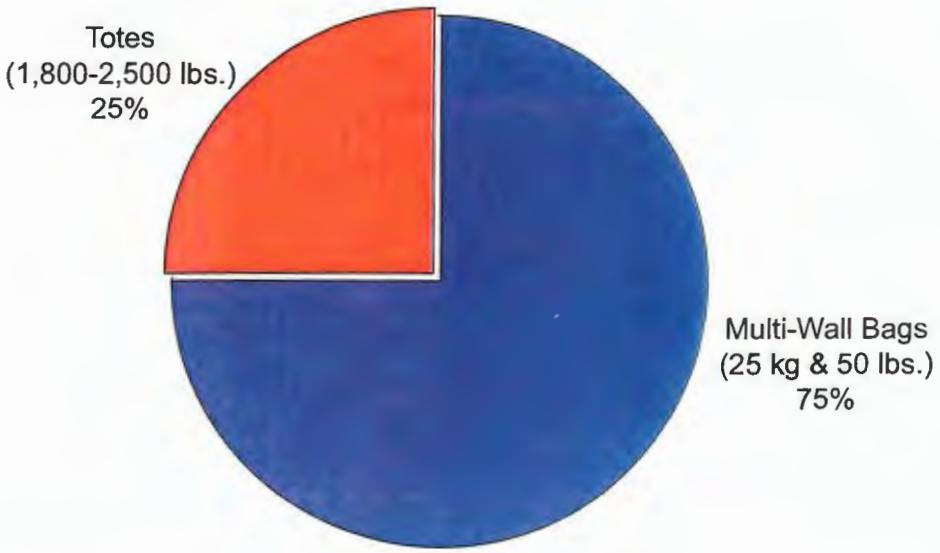
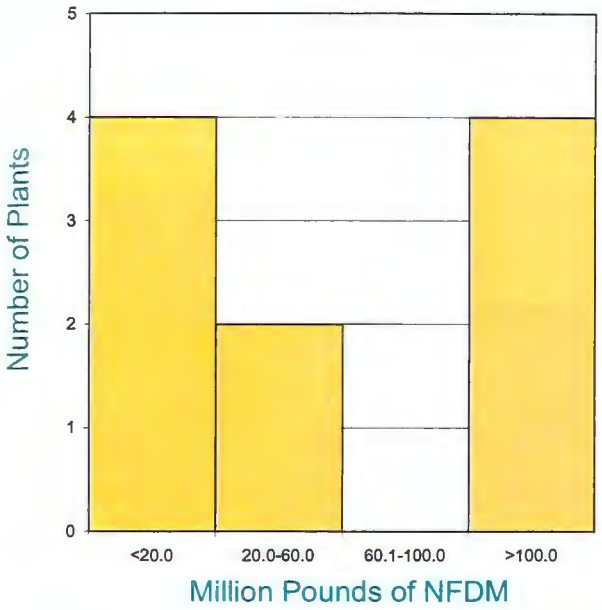


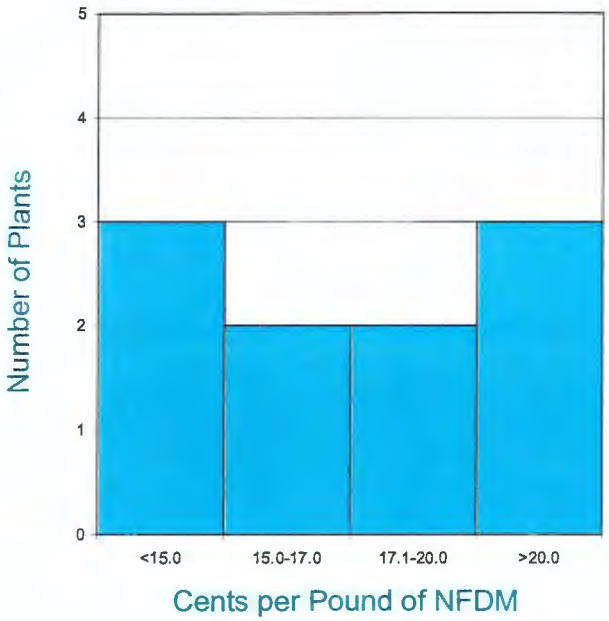
Figure 31. Annual California Nonfat Dry Milk Production



Average	=	74 million pounds
Median	=	37 million pounds
Average of low 3	=	11 million pounds
Average of high 3	=	162 million pounds

- Four plants produced more than 100 million pounds of NFDM annually which represents over 83% of total powder.
- On average, the three largest plants produced nearly 14 times more NFDM than the three smallest plants.
- NFDM plants tended to be located near milk supplies and not in or near large metropolitan centers.

Figure 32. NFDM Manufacturing Cost per Pound



Average	=	19.1¢ per pound
Wt'd Average	=	15.6¢ per pound
Median	=	17.5¢ per pound
Average of low 3	=	14.3¢ per pound
Average of high 3	=	26.0¢ per pound

- Three plants produced NFDM for less than 15¢ per pound, and three plants produced NFDM for more than 20¢ per pound.
- The four lowest volume plants were also the highest cost plants.
- The plants with the lowest processing labor costs had the lowest total manufacturing costs.

Figure 33. Share of California Nonfat Dry Milk Production by Ownership Type and by Workforce Type

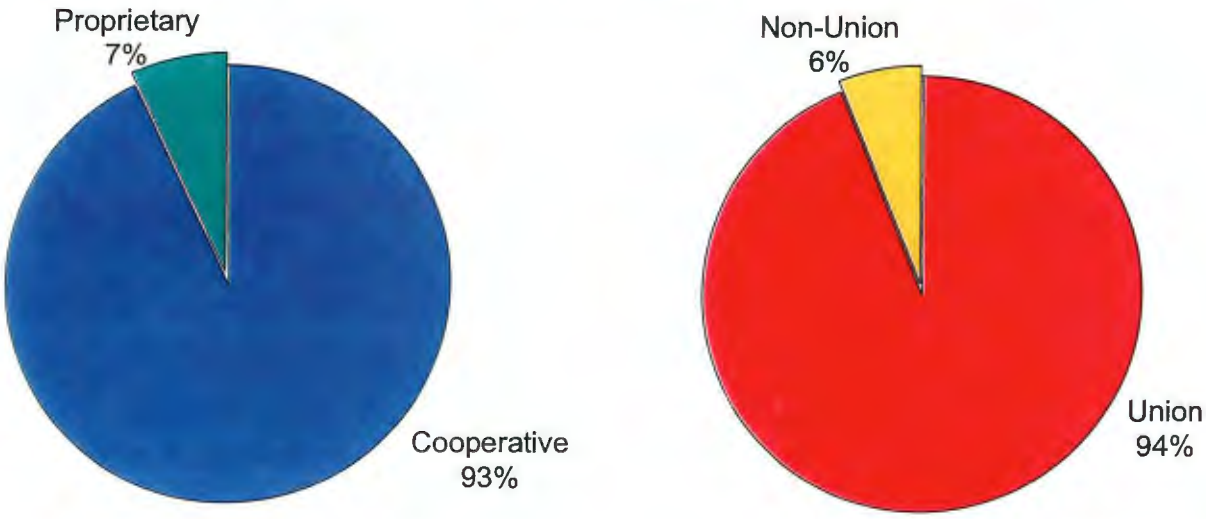
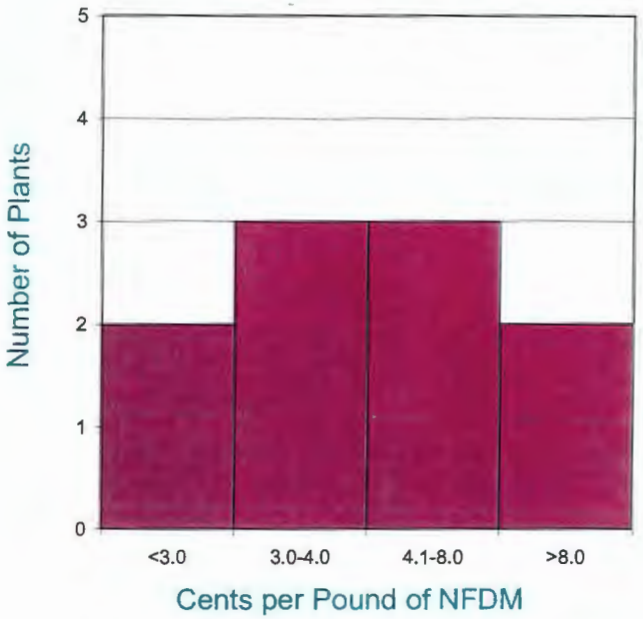


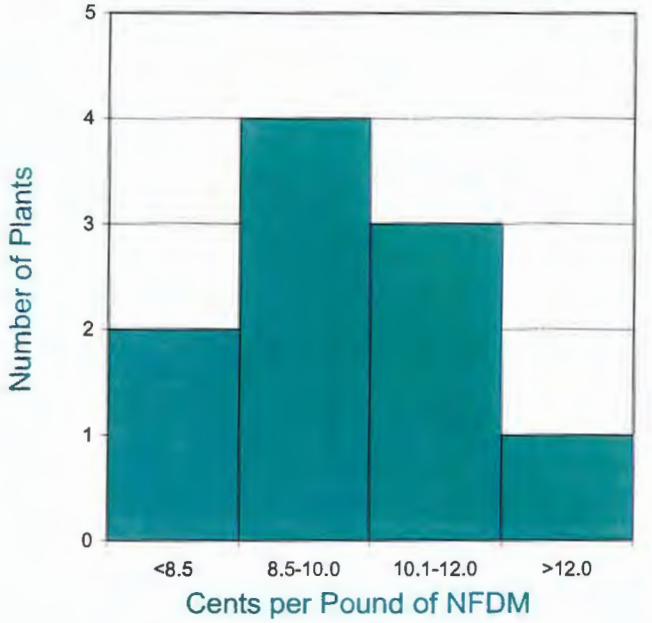
Figure 34. NFDM Processing Labor Cost per Pound



Average	=	5.2¢ per pound
Wt'd Average	=	3.6¢ per pound
Median	=	4.3¢ per pound
Average of low 3	=	3.0¢ per pound
Average of high 3	=	8.4¢ per pound

- Three out of ten plants had labor costs over 5¢ per pound.
- The average labor cost per pound for the high 3 plants was 177% higher than the average labor cost for the low 3 plants.

Figure 35. NFDM Processing Non-Labor Cost per Pound



Average	=	10.5¢ per pound
Wt'd Average	=	8.9¢ per pound
Median	=	9.4¢ per pound
Average of low 3	=	8.2¢ per pound
Average of high 3	=	14.3¢ per pound

- The variation in processing non-labor cost was much larger than other cost categories, ranging from 7¢ to over 20¢ per pound.
- In lower cost plants, processing non-labor costs were over one and one half times that of labor costs. In higher cost plants, processing non-labor costs was 70% higher than labor costs.

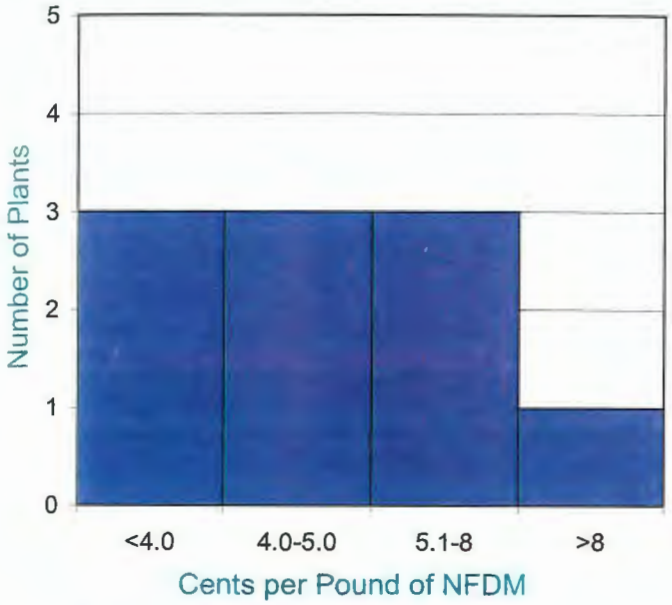
Figure 36. Nonfat Dry Milk Labor Breakdown by Category

Based on detailed data:
Labor cost averaged 3.6¢ per pound
Labor cost averaged $1.98 per 25 kg bag

Note: "Other" includes plant manager/ superintendent, general plant, plant clerical, and field men.

Figure 37. Utility Cost per Pound

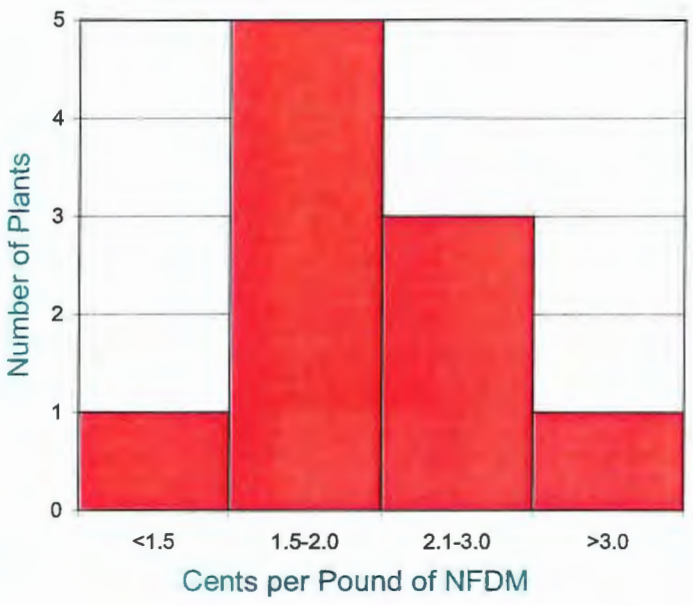
Includes cost of natural gas, fuel oil, electricity and sewage



Average	=	5.5¢ per pound
Wt'd Average	=	4.3¢ per pound
Median	=	4.5¢ per pound
Average of low 3	=	3.7¢ per pound
Average of high 3	=	8.0¢ per pound

- The operation of the dryer added significantly to the utility cost of the powder plants. In 8 out of 10 plants, natural gas costs ranged from 54% to 67% of the total cost of utilities.
- Most of the plants had utility costs between 3¢ and 6¢ per pound.

Figure 38. Repairs, Maintenance, and Supplies Cost per Pound



Average	=	2.0¢ per pound
Average	=	2.0¢ per pound
Wt'd Average	=	1.8¢ per pound
Median	=	1.8¢ per pound
Average of low 3	=	1.5¢ per pound
Average of high 3	=	2.7¢ per pound

- Six plants had costs less than 2.0¢ per pound.
- Cost of plant supplies exceeded repairs and maintenance by 30%.
- Per pound repairs and maintenance costs were lower in larger volume plants relative to smaller volume plants.

Figure 39. Weighted Average Breakdown of Dollars Spent per Year on Natural Gas and Electricity in NFDM Plants

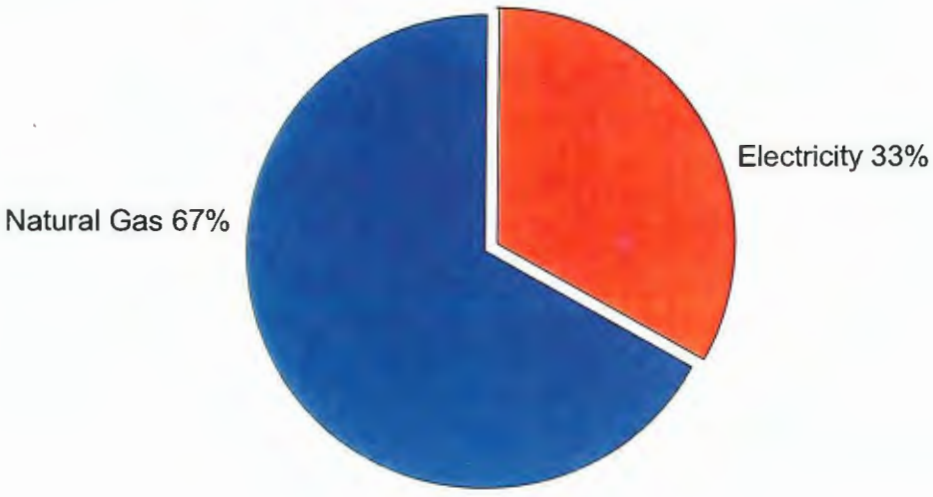


Figure 40: Comparison of Payroll Breakdown for Plant Employees and Salaried Employees

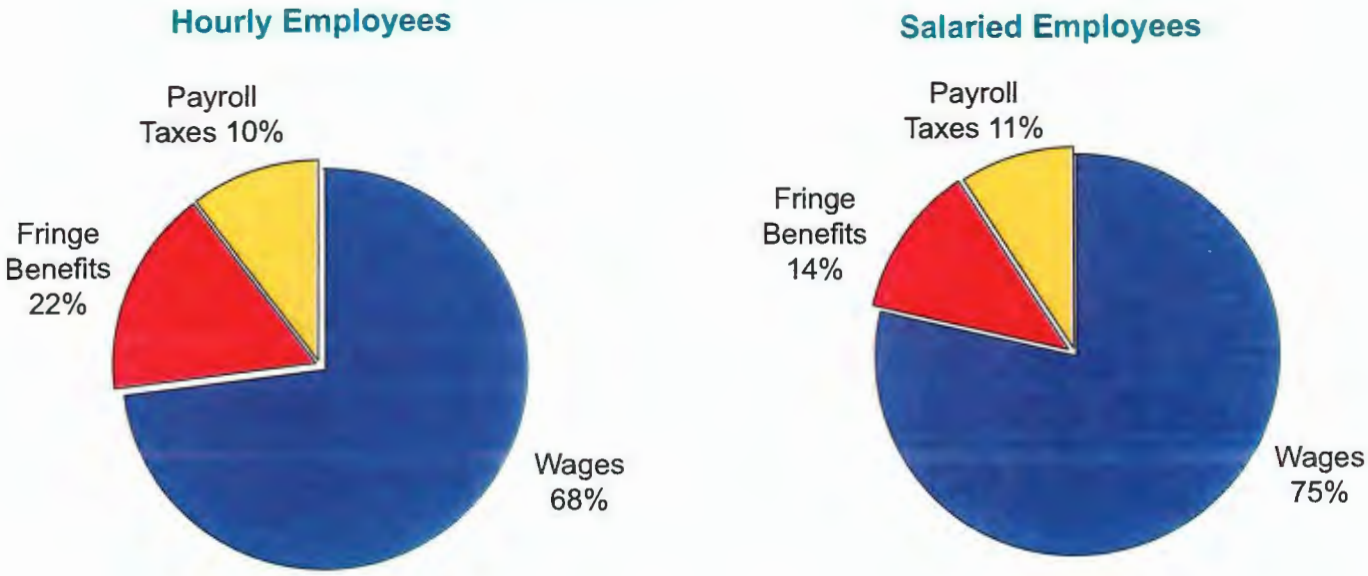
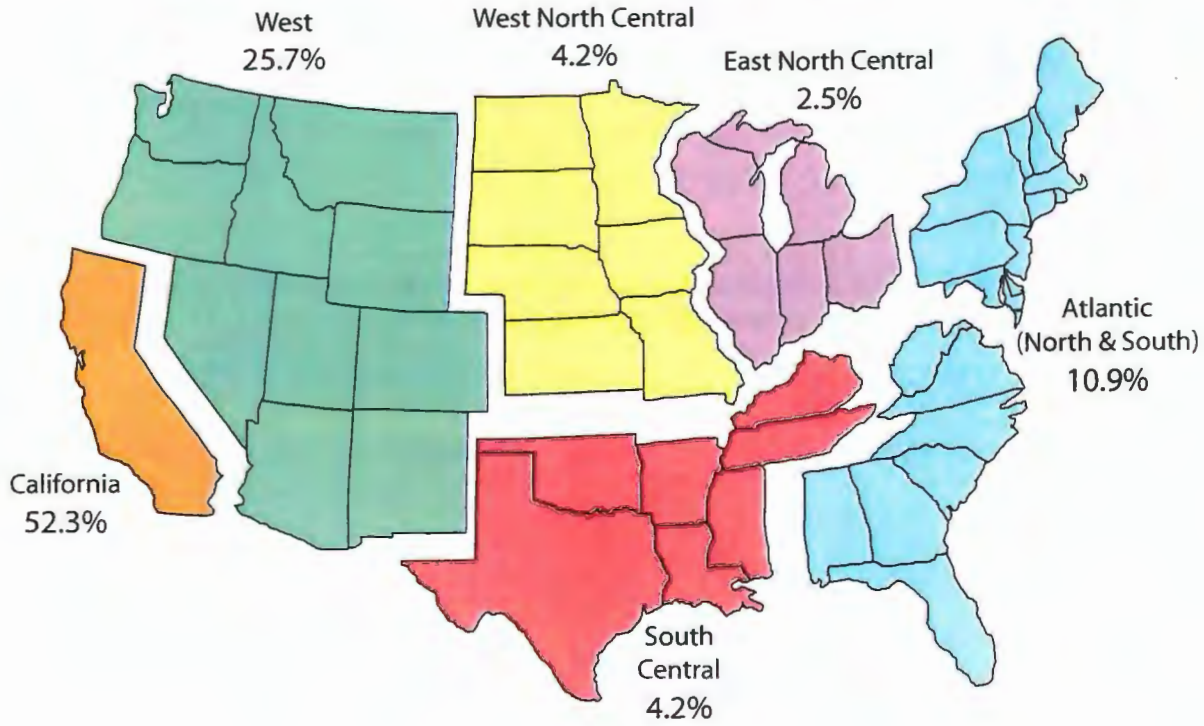


Figure 41. Share of NFDM Production, by Region, 2004



Condensed Skim and Cream

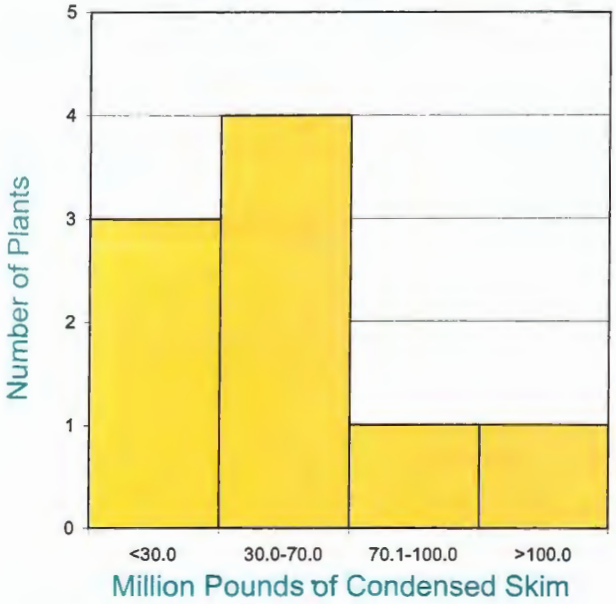
Most of the costs allocated to cream, condensed skim and other bulk dairy products come from indirect labor and indirect non-labor plant costs. There are very little, if any, direct plant costs allocated to bulk fluid products, thus the derived costs per pound of condensed skim and cream are not as precise compared to the derived costs per pound on packaged products such as butter, NFDM, and cheese whose plant costs are largely composed of direct costs.

Condensed Skim Overview

Cost studies were completed on nine condensed skim plants for 2003. The plants in the study accounted for about 94 percent of the condensed skim manufactured in California in the 2003 study period. In order not to reveal individual plant information, only general information is included in this section.

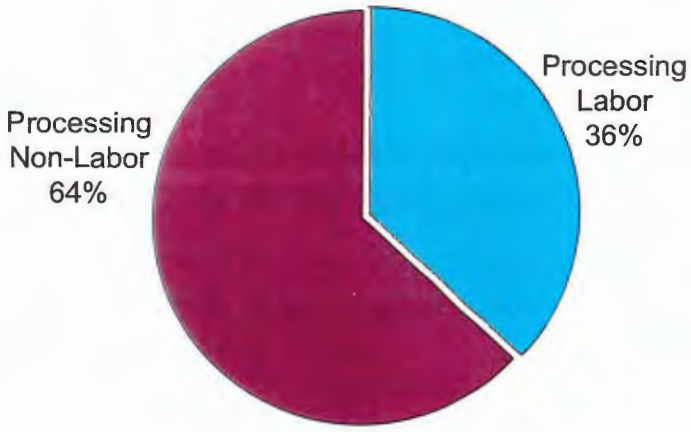
- Plants processed an average of 43 million pounds of condensed skim per year, but this statistic is somewhat misleading because of the tremendous disparity in actual processing volume. Two of the nine plants processed less than 20 million pounds per year, and two plants processed over 90 million pounds per year. The remaining five plants processed between 23 million and 40 million pounds per year.

Figure 42. Annual Condensed Skim Production



Average	=	43 million pounds
Median	=	36 million pounds
Average of low 3	=	12 million pounds
Average of high 3	=	82 million pounds

Figure 43. Comparison of Processing Costs for Condensed Skim



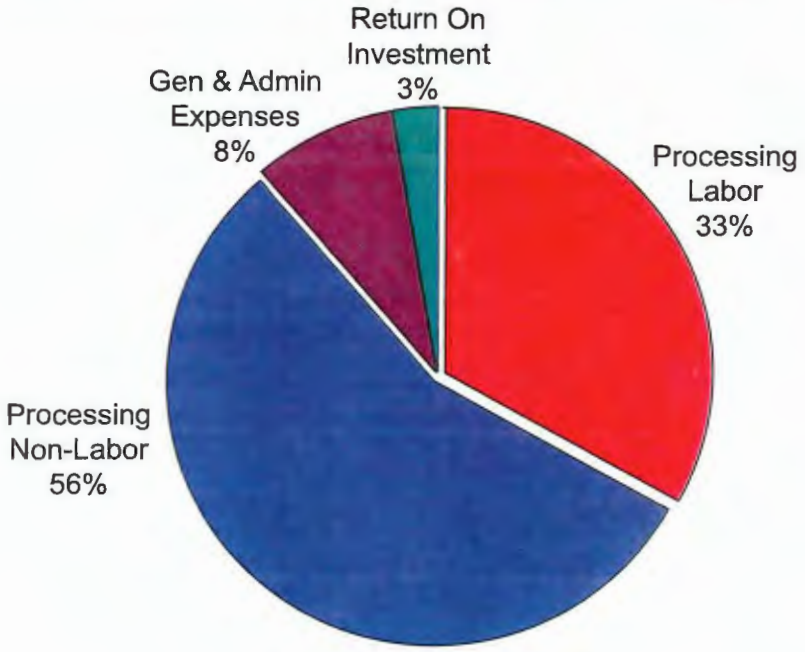
Processing non-labor includes utilities, depreciation, repairs and maintenance, laundry, supplies, and plant insurance

Low ratio	=	23% Labor 77% Non-Labor
High ratio	=	50% Labor 50% Non-Labor

- Contrary to logical assumption, there was almost no relationship between processing cost per pound and volume processed. Some of the plants with the most condensed skim production had among the highest costs. Similarly, some of the plants with the least condensed skim production had among the lowest costs.

- In general, processing non-labor costs for condensed skim production were about twice as large as labor costs but included several different plant expenses, such as utilities, depreciation, repairs and maintenance, laundry, supplies and plant insurance. Processing non-labor costs ranged from 1.4¢ per pound to 2.9¢ per pound.

Figure 44. Breakdown of Condensed Skim Processing Costs



Cream Overview

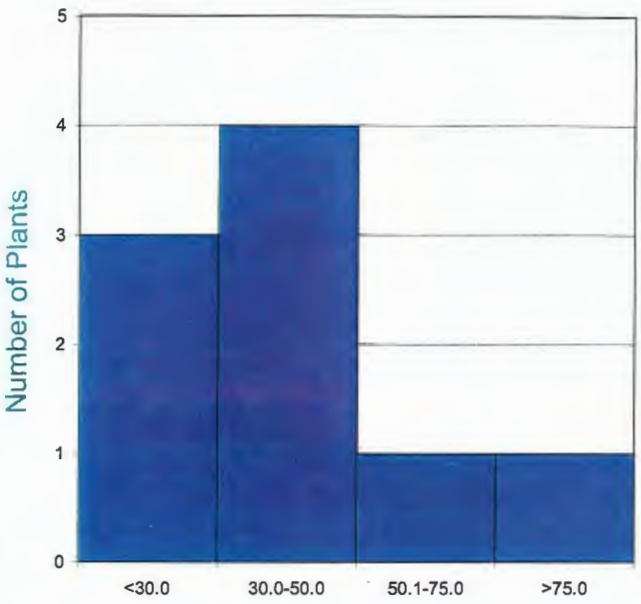
Cost studies were completed on nine cream plants for 2003. So as not to reveal individual plant information, only general information is included in this section.

- Plants processed an average of 36 million pounds of cream per year. Unlike condensed skim processing, the range of cream volumes was relatively narrow.

- There was a moderately strong negative relationship between processing cost per pound and volume processed. That is, larger plants tended to have lower per unit costs, and smaller plants tended to have higher per unit costs. However, as with condensed skim processing, some of the plants with more cream production had higher costs, and some of the plants with less cream production had lower costs.

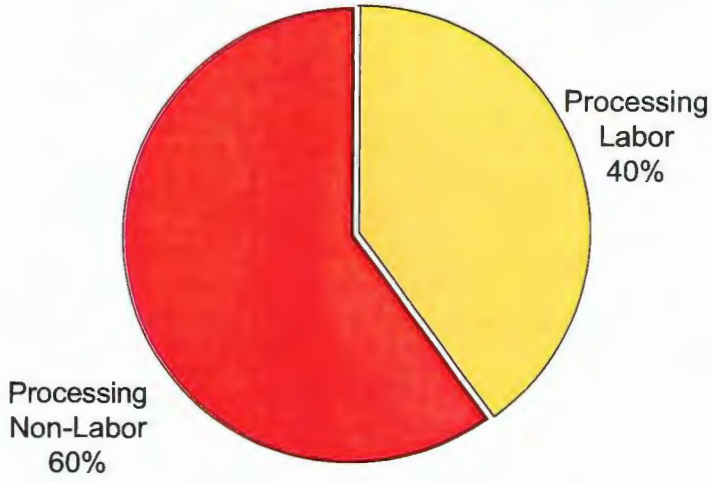
- In general, processing non-labor costs as a group were about 53% higher than labor costs but included several different plant costs, such as utilities, depreciation, repairs and maintenance laundry, supplies and plant insurance.

Figure 45. Annual Cream Production



Average	=	36 million pounds
Median	=	34 million pounds
Average of low 3	=	11 million pounds
Average of high 3	=	61 million pounds

Figure 46. Comparison of Processing Costs for Cream



Processing non-labor includes utilities, depreciation, repairs and maintenance, laundry, supplies, and plant insurance

Low ratio	=	29% Labor 71% Non-Labor
High ratio	=	55% Labor 45% Non-Labor

Figure 47. Breakdown of Cream Processing Costs