

Pooling Practices in Fruit, Vegetable, and Nut Processing Cooperatives

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FOREWORD

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POOLING PRACTICES IN FRUIT, VEGETABLE, AND NUT
PROCESSING COOPERATIVES

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SUMMARY

This report reviews the pooling practices of fruit, vegetable, and nut processing cooperatives in the United States. An extensive nationwide survey was conducted to assess general cooperative features, pool designs used, numbers of pools operated, methods of determining net revenues, nonmember participation, marketing contract provisions, interim payment plans, and attitudes toward pooling. Highlights from the study are:

Cooperative processors of fruits, vegetables, and nuts employ one of three bases for allocating pooled net returns among patrons: unweighted physical raw product units, physical raw product units weighted by indexes of quality factors, or market value of raw product. The first of these is appropriate if the raw products combined in a single pool are relatively homogeneous. If they are not homogeneous, the second or third basis is generally appropriate. Because fruits and vegetables differ markedly in kind, end use, and grade, cooperatives that use unweighted physical units to allocate net returns tend to operate a relatively large number of pools. Cooperatives that allocate net returns in proportion to raw product market value tend to operate the least number of pools, although it is becoming increasingly difficult to identify meaningful market prices in many areas. Finally, processors that handle a diversity of farm commodities usually operate more pools than do specialized firms.

Twelve of 32 surveyed cooperatives specialized in processing or handling a single type of fruit, vegetable, or nut. The other 20 firms processed a variety of crops, ranging from 2 to 30 in number. The average number of different commodities handled was six. Seventeen of the

cooperatives operated only one pool; the other 15 firms operated multiple pools, also ranging from 2 to 30 in number. The mean number of pools operated was slightly more than four.

About half the surveyed firms operated their pools on a fiscal year basis, "selling forward" any unsold inventories to the succeeding year's pool. Slightly more than half the cooperatives permitted or required nonmember patrons to participate in pools in the sense of being recipients of pool net returns. Nearly all the cooperatives used forward contracts with member-growers, which stipulated terms of raw product delivery. One-third of the firms used forward contracts with processed product customers. Many of the cooperatives surveyed had regular policies on scheduling and determining interim pool payments. Others made irregular interim payments or made only an initial and final payment.

The primary advantage cited in favor of pooling is that it enables cooperatives to freely commingle products and to conduct flexible marketing programs without causing unfair treatment of some members. Another advantage cited is that pooling reduces income risks faced by member-growers. An often mentioned disadvantage of pooling is that certain pool arrangements cause growers of relatively profitable crops to subsidize growers of less profitable crops. The challenge facing cooperatives is to develop procedures that preserve the marketing flexibility and risk insurance aspects of pools while ensuring that each member receives his proper share of net returns in the long run.

INTRODUCTION

Nearly all fruit, vegetable, and nut processing cooperatives allocate members' net returns on a pooling basis. To operate a pool, a cooperative adds the net returns from sale of a class of processed products, then allocates these returns in proportion to the number of physical or value units supplied by each patron to produce that class of products. The alternative to pooling is to conduct marketing operations by individual account, that is, to maintain identity of ownership of each patron's product until it is resold and to pay each patron the resale price less an allocated share of processing costs. Operation by individual account usually is impractical where a significant amount of processing occurs because it is inefficient to process goods without commingling large volumes of raw product. Besides facilitating efficient processing, pooling enables cooperative managers to conduct a flexible and market-oriented sales program, free of the need to coordinate sales with individual patrons' wishes. Finally, because any pooling arrangement involves averaging net returns among individual patrons, such an arrangement is likely to reduce patrons' income risk compared to what it would be under individual accounting.

There is a large number of ways to design marketing pools. Cooperatives differ in the unit or basis used for allocating net returns in each pool, the number of pools operated at any given time, overhead allocation methods, treatment of nonmembers, timing and calculation of interim payments, grower contract provisions, and other features. Literature on the subject of cooperative market pooling is instructive but sparse. Markeson (1959) developed a profile of pool and nonpool accounting in fruit and vegetable cooperatives in the mid-1950s. Sosnick's 1963 study of fresh avocado pooling at Calavo Growers established a useful analytic framework for distinguishing among pooling methods. Davidson's statistical summary (in 1969) of the departmentalization of patronage dividends provided insight into frequently used pool groupings in both marketing and supply cooperatives. There is no up-to-date, detailed profile of pooling procedures at fruit, vegetable, and nut processing cooperatives in the United States. The purpose of this report is to provide such information.

Unfortunately, the term "pooling" has not been used consistently in the literature. For example, "call" pools (in which each grower sets a

minimum price on sale of his product) are really versions of marketing by individual account. They are excluded from this study. In some bona fide pools, patrons initially are credited with the value of their raw product, then share in combined profits or losses net of raw product cost. Davidson calls this arrangement "net-margin-basis accounting" and Sosnick refers to it as a "refund" pool. In other situations, patrons receive no credit for raw product as such, but share the combined final product sales revenues net of processing cost. Davidson speaks of this arrangement as "pool accounting" and Sosnick calls it "initial-value-plus-refund" pooling. Both arrangements are true pools in the sense of the term used in this report.

SAMPLE AND METHODS

Sixty-three fruit, vegetable, and/or nut marketing cooperatives were identified by the Agricultural Cooperative Service, USDA, as marketing a significant proportion of their products in processed form. An extensive questionnaire soliciting information on market pooling operations was sent to each of these cooperatives. Seven of the 63 firms said they no longer operated as cooperatives or did not pool. Twenty-three firms did not respond to the questionnaire or to telephone entreaties. Completed questionnaires were obtained from the remaining 32 firms, representing 57 percent of the cooperatives believed to operate pools. Most of the firms which returned completed questionnaires were later telephoned to clarify ambiguities in responses and to discuss pooling issues in an open-ended manner.

Table 1 divides the cooperatives in the sample by function and by diversity of farm commodities handled. Twenty of the 32 responding cooperatives simultaneously served as grower representatives, processors of horticultural commodities, and marketers of these commodities in processed form (Row 1). Three firms were primarily marketers of fresh produce but also processed a significant proportion of their volume (Row 2). Four others were solely grower representatives but either had membership in a federated processing cooperative or had profit-sharing arrangements with a noncooperative processor (Row 3).^{1/} Two of the cooperatives were

^{1/} Cooperatives which act as grower representatives are bargaining agents for growers and perform accounting and farm supply services. A federated cooperative is one whose members are local cooperatives.

Table 1. Sampled cooperatives by function and diversity of product

Function	Diversity of Product			Total
	Variety of Fruits, Vegetables, and Nuts	Variety of Fruits	Single Fruit, Vegetable, or Nut	
Primarily processor and marketer	5	5	10	20
Primarily fresh marketer	1	1	1	3
Grower representative	1	2	1	4
Processor only	0	2	0	2
Processed product marketer	0	3	0	3
Total	7	13	12	32

federated processors that received all raw products from member locals (Row 4). Finally, three cooperatives acted only as marketers of final products processed by member locals or federations (Row 5).^{1/} One of the local cooperatives surveyed belonged to a federation that also responded to the survey. Two other responding cooperatives belonged to the same federated sales agency which also responded to the survey.

Besides being distinguished by function, the cooperatives in our sample are usefully divided into a class of 7 (22 percent) that handled a variety of fruits and vegetables, a class of 13 (41 percent) that handled a variety of fruits only, and a class of 12 (37 percent) that specialized in one type of fruit, vegetable, or nut.^{2/} Those dealing only with fruits consisted primarily of citrus, cherry, and grape processors. Because the diversity of a cooperative's operations would be expected to affect the type of pooling procedures it uses, diversified firms are distinguished from specialized ones in the following analysis. To accommodate the limited sample size, a diversified firm is defined as one handling two or more types of fruit or vegetable (Columns 1 and 2 of Table 1).

COOPERATIVE PROFILE

The size distribution of the 32 sampled cooperatives, as measured by market value of final products, market value of raw products, and number of members, is shown in Tables 2, 3, and 4. Figures refer to a 1980-81 fiscal year in most cases; some firms reported fall 1981 raw product value.

The mean sampled firm used \$29 million in raw products to produce \$75 million in final products during 1980-81. Average membership was 756. Most firms were somewhat smaller than the mean size and the number of cooperatives generally diminished with increasing size category. There was little difference in size distribution between diversified and specialized cooperatives. For example, mean sizes in the two categories were not significantly different in a statistical sense. Value of processed product

^{1/}One cooperative that handled primarily fresh citrus did not treat its domestic produce sales on a pool basis. This cooperative was classified as one of the three processed product marketers above.

^{2/}Tart cherries were categorized separately from sweet cherries for this classification.

Table 2. Market value of final products, 1980-81

Class	Value Group (million dollars)					
	0-50	51-100	100-150	151-200	201-250	251-300
Specialized	9	0	2	0	1	0
Diversified	9	4	4	1	0	2
Total	18	4	6	1	1	2

Value Mean: \$75.0 million
Value Range: \$1.5 to \$300 million

Table 3. Market value of raw products, 1980-81

Class	Value Group (million dollars)					
	0-25	26-50	51-75	76-100	101-125	No Value ^{a/}
Specialized	9	0	0	0	1	2
Diversified	7	2	3	2	0	6
Total	16	2	3	2	1	8

Value Mean: \$29 million
Value Range: \$1.1 to \$118 million

^{a/}No raw product value reported, in some instances because of absence of meaningful market prices.

Table 4. Number of members, 1980-81^{a/}

Class	Number Group					
	0-500	501-1000	1001-1500	1501-2000	2001-2500	over 2500
Specialized	8	1	0	0	1	2
Diversified	14	3	1	1	0	1
Total	22	4	1	1	1	3

Number Mean: 756
Number Range: 3 to 6,500

^{a/}One federated cooperative reported only the number of local cooperative members. This was not the cooperative with three members.

was significantly and positively correlated with number of members ($r = 0.44$) among all cooperatives taken as a group.

Roughly half the cooperatives (15) qualified for tax exemption under Section 521 of the Internal Revenue Code. Diversified firms were just as likely to qualify as were specialized firms. Twenty-six (81 percent) of the cooperatives were organized on a local or centralized basis; that is, they had only individuals as members. Three of the cooperatives surveyed were federations and the three remaining had both individuals and local cooperatives as members. All federated and mixed cooperatives handled more than a single farm commodity.

Respondents were asked to indicate the proportions of equity capital they acquired through per-unit retains, patronage refunds retained, and stock or certificate purchases. The most important equity acquisition method for each firm is represented in Table 5.

Table 5. How most member equity capital is acquired

Class	Per-Unit Retains		Retained Patronage Dividends	Stock or Certificate Purchase
	Physical Unit	Value Unit		
Specialized	5	1	5	1
Diversified	7	4	7	2
Total	12	5	12	3

Principal acquisition methods were use of per-physical-unit retains and retained patronage dividends. Few cooperatives relied on stock or certificate purchases.

Firms showed wide differences in methods used to retire equity capital. The most frequently used device was a variable period revolving fund (period frequently altered by the board of directors). But many cooperatives used fixed period revolving funds, base capital plans, or other procedures (Table 6).

Table 6. How member equity capital is retired

Class	Revolving Fund			Base Capital Plan
	Fixed-Period	Variable-Period	Other ^{a/}	
Specialized	2	5	3	2
Diversified	5	7	3	5
Total	7	12	6	7

^{a/} Revolved at termination of membership or not revolved.

The surveyed cooperatives infrequently paid interest on equity capital. Only one diversified cooperative paid such interest regularly; another diversified processor and two specialized processors paid interest irregularly. The remainder paid no interest on equity.

POOL DESIGN

The fundamental marketing pool principle is that each member's share of net returns should be proportionate to the number of physical or value units the member supplies to the cooperative in a given time period. Thus, pool designs are distinguished on the basis of two features: (a) the method of calculating net returns, and (b) the unit used to measure raw product shipments to the cooperatives, for allocating those returns. Net returns may reflect processing costs only (Sosnick's "initial-value-plus-refund pool") or they may reflect processing costs plus the market value of raw product ("refund pool"). Essentially three types of units can be used to measure members' raw shipments: unweighted physical quantity units, physical quantity units weighted by quality factors, and dollar value units. Examples of the first are tons or "boxes." Examples of the second are "estimated pounds solids" or "tons corrected for sugar content;" the number of potential weighting factors is in fact quite large. Examples of the third are "market" value or, more nebulously, "economic" or "established" value.

Combining the two methods of calculating net returns with the three types of volume units gives six possible pool design categories. Two of these categories are equivalent on practical grounds. If net returns are distributed proportionately to the dollar value of raw product shipped,

member payments are the same whether the cooperative first credits members with the value of raw product and subsequently deducts raw product value from net returns, or simply includes raw product value in the net returns distributed. Thus, the distinction between refund and initial-value-plus-refund pools is unimportant when net returns are paid per dollar market value of raw product. Only when refunds are paid per unit physical quantity of deliveries (quality-weighted or unweighted), does it matter whether the market value of raw product is included in calculated net returns. As a result, there are only five pool designs to consider.

The numbers of surveyed cooperatives falling into each of these five design categories are shown in Table 7. Cooperatives are divided between those operating a single pool and those operating multiple pools, as well as between those handling one and those handling many raw commodities.

None of the cooperatives allocating returns on a quality-weighted physical unit basis also operated a refund pool; that is, none of them credited growers with raw product market value before distribution of net returns. This is understandable because a common rationale for developing quality-weighting factors such as color weightings is that meaningful raw market prices are unavailable. Indeed, the practice at two cooperatives of using grade-differentiated market prices to credit members for raw product, then paying net returns (or deducting net losses) on the basis of unweighted physical units, seems difficult to justify.

Most of the cooperatives allocating returns by physical unit operated initial-value-plus-refund pools; they did not attempt to utilize raw product market prices to determine any part of members' payments. The tendency among these cooperatives was to compensate for the nonuse of market prices by weighting physical shipment quantities with quality indexes. As an example, a diversified, multiple-pool cooperative simultaneously used color, sugar content, and sugar/acid ratio indexes to weight raw shipment quantities. One specialized, single-pool processor used a color index and another simultaneously used sugar content and maturity indexes. Crucial to the use of such indexes is a board or membership decision on the exact weighting to be used for each quality grade identified. Presumably, these weightings should reflect the relative profitability of each quality grade in the firm's product line.

Table 7. Pool design: methods of determining member payments

Class	Initial-Value-Plus-Refund Pool		Refund Pool		Dollar Value Unit
	Unweighted Physical Unit	Quality-Weighted Physical Unit	Unweighted Physical Unit	Quality-Weighted Physical Unit	
Single Pool Firms					
Specialized	2	3	2	0	2
Diversified	0	0	0	0	8
Total	2	3	2	0	10
Multiple Pool Firms					
Specialized	1	1	0	0	1
Diversified	2	8	0	0	2
Total	3	9	0	0	3
All Firms					
Specialized	3	4	2	0	3
Diversified	2	8	0	0	10
Total	5	12	2	0	13

Only two of the cooperatives handling a diversified raw product line employed unweighted physical units to allocate net returns. Both of these firms avoided the potential inequity of such an arrangement by operating a separate pool for each raw product type and each raw quality grade. Each of the firms mentioned employed an average of 30 pools at any given time, although the number of pools varied from year to year with changes in the type and quality of product delivered to the cooperative.

Finally, a significant proportion of the cooperatives shown in Table 7 allocated net returns on the basis of dollar value of raw product. Use of dollar value units was especially prevalent among single-pool cooperatives that handled diverse raw commodities. In fact, no single-pool, diversified cooperative allocated net returns on any basis other than dollar raw value. For these cooperatives, determination of realistic or equitable dollar values for raw product is especially crucial. Ideally, such values are based on prices paid by proprietary processors operating in the same locale as the cooperative itself. Where nearby proprietary volume is insufficient, cooperatives frequently utilize prices paid growers in distant regions, perhaps as adjusted by subjective factors. The problem of accurate raw product pricing is likely to worsen in those regions and among those commodities where the market share of proprietary processors is diminishing.

Eight of the 13 cooperatives which allocate returns on the basis of raw product dollar value distinguish, for reporting purposes, that portion of a grower's payment associated with raw product value and that associated with processing earnings. The other five firms make no distinction between raw product payment and refund or net earnings. As indicated, the distinction has no impact on the total payment that each grower receives.

NUMBER OF POOLS

The number of pools initiated and operated by each cooperative each year is summarized in Table 8. These figures exclude pools that were initiated in a previous year but that remain open pending sale of the previous year's pack.

Diversified cooperatives are categorized in Table 8 by number of raw products handled. In telephone conversations with respondents, I attempted to ensure that the raw commodity classes listed on questionnaires

corresponded to those that buyers perceived to be different products and to usually differ in unit value. The listings normally included important crop varieties but not raw product grades. Certain respondents likely were more careful than others in reporting varietal differences.

Table 8. Number of pools operated, by number of raw products handled

Number of Raw Products	Number of Pools					Total
	1	2	3-4	5-6	More Than 6	
Specialized (1)	9	1	2	0	0	12
-----	-----	-----	-----	-----	-----	-----
2	1	5	1	0	0	7
3-6	3	0	0	1	1	5
More Than 6	<u>4</u>	<u>0</u>	<u>1</u>	<u>0</u>	<u>3</u>	<u>8</u>
Total Diversified	8	5	2	1	4	20
-----	-----	-----	-----	-----	-----	-----
Total	17	6	4	1	4	32

The mean number of raw products handled per firm was six and the mean number of pools operated per firm was 4.4. The maximum number of raw products and maximum number of pools in the sample were both 30. Single pools were used by a somewhat greater proportion of the specialized cooperatives (75 percent versus 40 percent). Generally, there is a suggestion in Table 8 of a modest correlation between number of raw products handled and number of pools operated. But there are frequent exceptions to this correlation. For example, half the firms handling more than six products conducted only one pool. Conversely, three of the specialized cooperatives operated more than one pool. One of the latter divided pools on the basis of end use--namely brined, canned, fresh, and frozen. Another specialized cooperative divided pools on the basis of end use and geographic origin; the third operated separate pools for hand-harvested and mechanically harvested fruit.

Factors Affecting Number of Pools

It is clear from Table 8 that the number of pools a cooperative operates depends on more than just the number of raw commodities it handles.

Of course, we expect the number of pools partly to depend on the heterogeneity of raw products, that is, on the geographic dispersion of members' farms and upon variations in raw product type, variety, quality, and time of harvest. But, in addition, the number of pools would be expected to depend upon the ease with which meaningful values can be assigned to these heterogeneous raw goods. To the extent the diversity of raw products increases, and to the extent it becomes more difficult to assign relative values or weights to diverse raw products, it becomes more desirable on grower equity and incentive grounds to increase the number of pools operated. These hypotheses were tested by fitting the following regression model to the 32-cooperative sample, using ordinary least squares:

$$(1) \quad \text{NPOOLS} = a + b(\text{NRAW}) + c(\text{FRESH}) + d(\text{UNWHT}) + e(\text{WHT})$$

where NPOOLS is the number of pools simultaneously operated by the cooperative;

NRAW is the number of raw products it handles;

FRESH is a one if the cooperative sells product in fresh as well as processed form, zero otherwise;

UNWHT is a one if net returns are distributed on the basis of unweighted physical raw product units, zero otherwise;

WHT is a one if net returns are distributed on the basis of quality-weighted physical raw product units, zero otherwise;

and a, b, c, d, e are coefficients to be estimated.

The variable FRESH was designed to augment NRAW in reflecting raw product diversity. Because products sold fresh are generally of higher grade than those processed, the variable FRESH was useful in distinguishing at least a portion of the significant quality differences not reflected in NRAW. The signs of coefficients of NRAW and FRESH should each be positive because raw product diversity is hypothesized to increase the number of pools operated.

Variables UNWHT and WHT were designed to describe the cooperative's practice of distinguishing raw product values. Processors in the UNWHT category did not discriminate members' products by value; processors in the

WHT category did so discriminate on the basis of quality index weightings. No variable was included to represent the category of processors who used market prices to discriminate raw product value. Thus, the coefficient of UNWHT represents the mean difference in number of pools operated between cooperatives in the UNWHT category and those in the category that used market prices, holding constant the number of raw commodities handled. The coefficient of WHT can be interpreted similarly. It is reasonable to assume that the most accurate and cost-effective means of identifying raw product values is through use of market prices, providing that adequate markets for these products exist. On this assumption, most cooperatives using unweighted or weighted physical units to allocate net returns probably view such units as relatively imperfect valuation devices, encouraging the operation of more pools than would be necessary if accurate market prices were available. Signs of coefficients of UNWHT and WHT, in other words, should be positive.

Estimation Results

The results of fitting equation (1), shown below with t-values in parentheses, strongly support this reasoning.

$$(1') \quad \text{NPOOLS} = -3.49 + 0.69 \text{ NRAW} + 8.16 \text{ FRESH} + 6.00 \text{ UNWHT} + 5.66 \text{ WHT}$$

$$\quad \quad \quad (-2.62) \quad (6.45) \quad (3.05) \quad (2.63) \quad (3.27)$$

$$R^2 = 0.75$$

$$F = 19.83$$

Taken as an average across all cooperatives surveyed, an increase by one in the number of raw commodities handled is associated with an addition of nearly one pool (specifically, 0.69 of a pool). Holding constant the number of crops handled and the method of valuing raw product, cooperatives selling some commodities in fresh form operated an average of eight pools more than those who sold goods only in processed form. Firms allocating net returns on an unweighted physical unit basis operated, on average, six pools more than those allocating net returns on a dollar value basis, holding constant the number of crops handled and the form of product. Similarly, firms using a quality-weighted physical unit to allocate returns operated, on average, just under six pools more than those using dollar value units.

On the evidence of the t-values shown, we may assert with less than a one percent chance of error that each of the factors discussed is indeed associated with the number of pools operated. Whereas differences among cooperatives in the number of raw products handled (NRAW) explained only 54 percent of the variation in number of pools operated, the four factors together (NRAW, FRESH, WHT, UNWHT) explain 75 percent of the variation in number of pools. The remaining 25 percent of variation in pool numbers is probably explained by: (a) discrepancies among respondents in the detail with which raw product type, quality, and variety were differentiated; (b) the frequency of geographically-based pools and miscellaneous end-use-type pools, such as brine pools, which collectively are difficult to represent in equation (1) or (1'); and (c) differences among cooperatives in the degree to which raw products with fundamentally different unit raw values are permitted to earn equal unit shares of net returns. Relative to (c), some cooperatives take greater pains than others to ensure that each raw product class earns its "fair" share of net returns in the long run. To ensure this, a separate pool must be operated for each commodity whose fundamental raw value is unknown.

Although equation (1) or (1') implies that a cooperative's basis for allocating net returns affects the number of pools it operates, one must admit that this causality could be reversed in some circumstances. If a cooperative's board or membership is firmly committed to a given number of pools, it must select a unit for allocating net returns that is consistent with this number of pools, with the diversity of crops, and with the cooperative's tolerance for "unfair" long-run allocations of net returns. In this sense, the number of pools operated may influence the basis used for allocating net returns, rather than vice versa. Usually, however, the cooperative is constrained in its choice of allocation unit by the information readily available for valuing raw products. Thus, it is a good presumption that the multiplicity of pools is usually varied to accord with the allocation unit employed.

DETERMINATION OF POOL NET RETURNS

A cooperative must compute the net returns associated with each pool it operates so that these returns may be allocated to members according to

the raw product physical or value unit selected. To determine net returns, the cooperative first must establish policies regarding: (a) the interval of time during which raw product deliveries are regarded as belonging to a given pool; (b) the intervals of time during which final product sales revenues and operating costs are tallied for a given pool; (c) terms of inventory sale, if any, to succeeding pools; and (d) allocation of overhead costs to each pool if more than a single pool is used.

Nearly all the surveyed firms included within each pool the entirety of designated products delivered within a particular "harvest season." None of the cooperatives included in one pool raw products harvested during different seasons or years. Only three of the cooperatives divided a single harvest season into separate pool periods, and in each instance this was done for commodities marketed in fresh form. In one of the latter cooperatives, commodities sold in processed form were pooled on a season basis.

The period during which revenues and costs were tallied for a given pool corresponded to the period within which some of the pool's inventory remained unsold. Fifteen (47 percent) of the surveyed cooperatives terminated pool revenues and cost calculations at the end of the fiscal year by selling forward any unsold inventory to the succeeding year's pool. Of the remaining firms, three (9 percent) said a given pool's inventory was usually sold within three months of harvest, nine (28 percent) said it took 12 to 15 months to dispose of inventories, and the remaining five (16 percent) indicated that inventories usually were not fully sold until 18 to 24 months after harvest. The actual figures fluctuated from year to year according to market conditions. Several cooperatives said they continue to debit each pool with direct inventory costs until all inventory is sold, but that overhead costs are debited only for the fiscal year in which processing occurred.

Eleven (73 percent) of the 15 cooperatives that sold forward their pool inventory on a fiscal year basis valued inventory at current market prices or net realizable value. Only one firm said it valued inventory at estimated cost of production, presumably including raw product "cost." Three firms valued inventory at market prices or estimated cost, whichever was less. There was no significant difference between specialized and diversified cooperatives, or between multiple-pool and single-pool cooperatives, in inventory valuation methods. But a disproportionately large number of firms that did not sell forward their inventories were multiple-pool

cooperatives. It is possible that single-pool cooperatives are more concerned than multiple-pool cooperatives with the effects that inventory sales have on specialized producers.

Except for reporting purposes and for evaluating the gross or net margins of each raw product line, single-pool cooperatives have no need of allocating overhead among commodities handled. In multiple-pool arrangements, however, both plant and administrative overhead must be apportioned to each pool to permit determination of each pool's full costs. No attempt was made to study the procedures used for allocating plant overhead to each product line or pool. But multiple-pool cooperatives were asked to indicate their methods of assigning administrative overhead costs. Answers are summarized in Table 9.

Table 9. Basis for allocating administrative overhead

Class	Sales Revenue	Unweighted Raw Product Volume	Quality-Weighted Raw Product Volume
Specialized	1	2	0
Diversified	6	3	3
Total	7	5	3

Seven (47 percent) of the 15 multiple-pool firms allocated administrative overhead in proportion to the final product sales revenues earned by each pool. Five (33 percent) of the firms allocated overhead in proportion to the unweighted raw product volume delivered. The remaining three firms (20 percent) used raw product volume as weighted by quality factors (see also Table 7). Numbers shown in the first row of Table 9 correspond to the three single-commodity cooperatives that operated separate pools based on end use, geographic origin, or harvest method (see also Table 8). There was no statistically significant difference between specialized and diversified cooperatives in the overhead allocation method employed.

POOL PARTICIPATION

A grower is considered to fully participate in a pool if (a) sale of the grower's produce is used to provide revenue for the pool, and (b) the grower receives a share of the pool net proceeds. Some growers are not given the option of participating in a pool in the second sense; these individuals are paid on an "immediate fixation" or cash basis at delivery. Other growers are required to participate fully in the pool or pools. All the surveyed cooperatives, for example, required each member to participate in the pool(s) as both sources and recipients of pool net returns.

Treatment of nonmembers is much more varied. Sixteen (50 percent) of the cooperatives required nonmember growers to be full pool participants in the senses described above. Only nine of the latter firms qualified under Section 521 of the Internal Revenue Code, obligating them to treat nonmembers the same as members in determining grower payments. Seven (22 percent) of the cooperatives required nonmembers to receive immediate payment for their products at time of delivery. Two (6 percent) of the firms gave nonmembers a choice between immediate payment or full pool participation. The remaining seven (22 percent) cooperatives received no products from nonmembers or required all patrons to become members. These data are summarized in Table 10, where "exempt" indicates the cooperative qualified under Section 521 of the IRS code and "participate" indicates that nonmembers were both sources and recipients of pool net returns. About one-half the nonexempt cooperatives treated nonmembers the same as members in determining grower payments. There were no significant differences between specialized and diversified cooperatives in the treatment of nonmembers.

Table 10. Nonmembers' options regarding pool participation

Tax Status	Must Participate	Must Receive Immediate Payment	Participate or Receive Immediate Payment	No Nonmembers
Exempt	9	0	0	6
Nonexempt	7	7	2	1
Total	16	7	2	7

If a cooperative decides to treat purchases of nonmembers' products on an immediate fixation or cash basis, it must decide how to allocate the net returns or losses associated with these products. Two major alternatives are to (a) include the net returns or losses with pool net returns, thus allocating them to members, or (b) retain the net returns or losses in unallocated form. Similarly, income earned from such nonpatronage sources as building rental or stock dividends may be included in pool returns or left unallocated. Table 11 shows the sources of revenues or net returns used by cooperatives to calculate pool payments.

Table 11. Sources and recipients of pool net returns

Recipients	Sources			Total
	Sales of Members' Products	Sales of All Patrons' Products	Patron and Nonpatron Business	
Members Only	8	3	3	14
All Patrons	0	9	9	18
Total	8	12	12	32

Cooperatives listed in Column (1) retained profits from nonmember or nonpatronage business in unallocated form; those in Column (2) retained only nonpatronage returns in unallocated form; and those in Column (3) included all business in calculating pool returns.

As Table 11 indicates, the surveyed firms were about equally divided between use of these three allocation practices. Eight of the firms that barred nonmembers from being pool recipients based pool net returns on member business alone; six such cooperatives included nonmember business in calculating returns.^{1/} In comparison, cooperatives allowing all patrons (including nonmembers) to be pool recipients based pool net returns either on all patron business or on all patron and nonpatron business.^{2/}

^{1/}The 14 cooperatives disallowing nonmember pool participation (first row of Table 11) correspond to the 14 cooperatives included in Columns 2 and 4 of Table 10).

^{2/}These 18 cooperatives correspond to those included in Columns 1 and 3 of Table 10.

Specialized and diversified cooperatives did not significantly differ in respect to treatment of nonmember and nonpatron business.

MARKETING CONTRACTS AND INTERIM PAYMENTS

Contracts With Growers

Most surveyed cooperatives participate in forward marketing contracts with member-growers. The contracts differ widely in detail but essentially require members to deliver, and the cooperatives to accept, a certain quantity of produce or the entire production from specified acreage. Durations of contract instruments depend partly on the types of commodities involved. Multiple-year contracts are more common among perennial fruit and nut crops than among annual vegetable crops. However, single-year contracts are more common than multiple-year ones, even among perennial crops. These results are depicted in Table 12.

Table 12. Duration of member-growers' forward contracts

Commodities Handled	Single Year	Multiple Year	No Contracts
Fruits and Nuts	11	10	3
Vegetables	8	0 (3)	0
Total	19	10 (3)	3

One of the seven surveyed mixed fruit and vegetable cooperatives primarily handled fruits; this firm is included in Row 1 of Table 12. The six other mixed fruit and vegetable firms primarily handled vegetables and they are included in Row 2. Only two cooperatives handled vegetables exclusively. Three firms that primarily handled vegetables employed single-year contracts with vegetable growers and multiple-year contracts with fruit or nut growers. The latter multiple-year contracts are shown in parentheses in Table 12 to indicate they were not the cooperatives' predominant contract form. All vegetable cooperatives utilized some form of grower contract but several fruit cooperatives did not. Many cooperatives of both types employed "open-ended" contracts, those that remain in force indefinitely unless either

party terminates the arrangement in the early spring. Such contracts are classified in the single-year category in Table 12.

Contracts With Customers

In the horticultural processing industries, it is not as common for cooperatives to forward contract with final product customers as it is for them to forward contract with member-growers. Yet, eight (25 percent) of the interviewed cooperatives sold the majority of their final products on a one-year contract basis. Four others (12 percent) sold all their final products on a multiple-year contract basis. Fifteen (47 percent) of the firms took "bookings" on sale of most of their products, but such bookings did not legally obligate either the cooperative or the customer. Five (17 percent) of the firms neither signed final product sales contracts nor took bookings. These figures are summarized in Table 13, in which, just as in Table 12, the sample is divided between primarily fruit-nut and primarily vegetable firms.

Table 13. Duration of customers' forward contracts

Commodities Handled	Single Year	Multiple Year	Bookings Only	No Bookings or Contracts
Fruits and Nuts	6 (2)	3	10 (1)	5 (1)
Vegetables	2	1	5 (1)	0 (1)
Total	8 (2)	4	15 (2)	5 (2)

Six cooperatives utilized more than one type of sales arrangement with customers. The predominant arrangement employed by each of these six firms is included in the unparenthesized figures in Table 13; the firms' less important arrangements are shown in parentheses. An interesting aspect of Table 13 is that fruit and nut cooperatives show no greater tendency to use customer contracts, or to use multiple-year customer contracts, than do vegetable cooperatives. For example, the proportion of fruit and nut cooperatives that used primarily single-year customer contracts was 6/24 or 25 percent. The proportion of vegetable cooperatives using such contracts was 2/8, also 25 percent. Similarly, 12 percent of both fruit-nut firms and vegetable firms primarily employed multiple-year customer contracts.

By contrast, 42 percent of the fruit and nut cooperatives primarily employed multiple-year contracts with member-growers, while none of the mixed-crop or vegetable cooperatives used multiple-year contracts with vegetable growers (Table 12).

The basis for the discrepancy is that eight (33 percent) of the fruit and nut cooperatives contracted to receive raw product on a long-term basis while contracting to sell the processed product on only a one-year basis. Only one fruit and nut cooperative reported contracting for raw product on a one-year basis while arranging for processed product sale on a multiple-year basis. Two (8 percent) of the fruit-nut cooperatives contracted both raw product receipts and processed product sales on a long-term basis, while four (17 percent) of such cooperatives contracted both receipts and sales on a one-year basis. The remaining nine (38 percent) arranged for raw product receipts on either a one-year contract or noncontract basis while arranging for sales on a noncontract basis. No vegetable cooperative reported being simultaneously committed to multiple-year grower contracts and single-year customer contracts, and only one indicated it used single-year grower contracts together with multiple-year customer contracts for a given commodity. Many cooperatives in each category utilized one-year grower contracts and sold all processed products on a noncontract basis.

Actually, the degree to which cooperatives have secured contractual sales arrangements may be overrepresented in Table 13. Five of 12 firms who reported they sell final products on contract indicated the contract sales price is tied to market price quotations at time of delivery. This type of contract provides security only for firms operating in relatively illiquid markets, in which actual sale prices frequently differ from those quoted or realized by others. The contract provides no added security in relatively liquid markets. Five cooperatives reported that contract prices are fixed at time of contract signing, and one firm said it employed a cost-plus type of contract. Such contract instruments do provide significant revenue security. The remaining three cooperatives were local members of regional marketing cooperatives; these locals participated in the pool returns of the regional firm.

Interim Payments

The presence or absence of customer contracts can greatly affect a cooperative's cash flow as well as its pool net returns. Another factor affecting cash flow is the set of arrangements made for distributing pool net returns to participating patrons. Essentially, distribution arrangements consist of two somewhat independent policies: (a) the timing of interim payments to participants, and (b) the calculation of initial and interim payments. Proportions of payments made in cash as opposed to certificates are not discussed in this report. Generally, earlier payments contain a greater proportion of cash and later payments contain a greater proportion of revolving fund certificates.

Methods used by the surveyed cooperatives to time interim payments to pool participants are summarized in Table 14. All interviewed firms made an initial payment at harvest time and a final payment when the pool closed. Data in Table 14 refer to any payments made between the initial and final payments.

Table 14. How interim pool payments are timed

Class	At Pre-Established Intervals	At Discretion of Board or Management	No Interim Payments
Specialized	4	2	6
Diversified	12	7	1
Total	16	9	7

Sixteen (50 percent) of the firms distributed returns at intervals established by board or management before the harvest season. These intervals were not necessarily regular. Some cooperatives increased the frequency of payments and others decreased the frequency of payments as the pack was sold. Nine (28 percent) of the firms made payments "as conditions warranted"; they did not announce before harvest when payments would be made. Seven (22 percent) of the cooperatives made no interim payments between the initial advance and the final pool settlement.

Diversified cooperatives were more likely than specialized ones to make interim payments to growers. That is, the proportion of diversified

cooperatives making interim payments was greater than would be expected by chance. Concomitantly, the proportion of specialized firms not making interim payments also was more than would be expected by chance.^{1/} This is understandable because diversified processors are likely to enjoy a more regular cash flow from sales revenues than are processors of a single product line. Among those making interim payments, diversified processors were about equally inclined as specialized ones to do so on a pre-established basis.

Many cooperatives develop policies for calculating initial and interim pool payments. Table 15 summarizes the policies employed by cooperatives responding to the survey.

Table 15. How initial and interim pool payments are calculated

Class	Fixed Proportions Of			At Discretion of Board or Management
	Estimated Final Net Returns	Most-Recent Sales Revenues	Raw Product Market Value	
Specialized	2	0	6	4
Diversified	6	3	6	5
Total	8	3	12	9

Eight (25 percent) of the respondents said they based each payment primarily on an updated forecast of final net returns per unit. Only three firms said they based pool payments on current sales revenues alone. Twelve firms (37 percent of the sample) paid patrons fixed percentages of the estimated market value of raw product. Four of the latter 12 firms made no interim payments subsequent to the initial harvest advance; the eight firms that did make subsequent payments gradually increased with each payment the proportion of raw product market value credited to growers. Finally, nine (28 percent) of the cooperatives did not indicate a determinate policy regarding payment calculations. Regardless of the interim payment

^{1/}The calculated Chi-square value in a 3-by-2 contingency test, using Table 14 data, was 8.95. The critical value of Chi-square at the 95 percent confidence level with 2 degrees of freedom is 5.99. Thus, we can reject the hypothesis of no relationship between payment timing and degree of cooperative specialization.

policy employed, final payments always were made so as to ensure that each patron received his specified share of pool net returns.

PERCEIVED ISSUES IN POOLING

Because efficient operation of mechanized food processing equipment requires commingling of individual growers' raw products, processing cooperatives have few if any viable alternatives to pooling. Still, a cooperative can choose to include in a single pool several raw product categories, such as oranges and grapefruit, that are not necessarily commingled during processing. A cooperative's willingness to reduce the number of pools operated, and hence increase the average number of raw product categories in a particular pool, depends on its perceptions of the relative merits of pooling. Advantages commonly associated with reducing the number of pools operated are: (a) a probable reduction in income risk faced by each individual member; (b) increased flexibility in final product marketing consistent with equitable treatment of members; and (c) reduced accounting costs. The disadvantages commonly associated with decreasing the number of pools operated are: (a) an increase in the extent to which growers of less profitable crops are "subsidized" by growers of more profitable crops; and (b) a consequent decrease in incentives to produce high-profit crops or to achieve high raw product grade standards.

Survey respondents were asked to rank a series of prospective advantages associated with pooling (or with decreasing the number of pools) and a series of prospective disadvantages with pooling. Results of these rankings are given in Tables 16 and 17. Numbers shown in the tables correspond to the frequency with which respondents listed each advantage or disadvantage in the indicated rank. Many cooperatives did not rank some of the items, presumably implying the items were not a significant advantage or disadvantage.

Table 16. Advantages of pooling or of decreasing the number of pools

Advantage	Rank					Unranked
	1	2	3	4	5	
Improves fairness of members' returns	8	10	5	3	0	6
Permits raw product commingling	12	4	4	2	1	9
Diminishes members' income risk	7	5	3	3	6	8
Increases cooperative's marketing ability	2	8	5	2	0	15
Reduces accounting costs	0	1	4	6	6	15

Table 17. Disadvantages of pooling or of decreasing the number of pools

Disadvantage	Rank				Unranked
	1	2	3	4	
Reduces fairness of members' returns	13	5	0	0	14
Diminishes incentives to produce high quality farm products	6	6	1	0	19
Increases members' income risks	0	2	9	1	20
Increases accounting costs	0	2	2	8	20

If each rank is assigned a value such that value and rank are linearly related, the overall most highly ranked advantage of pooling is that it improves the fairness of members' returns.^{1/} Respondents probably had difficulty distinguishing this from the fourth-ranked advantage of increasing the cooperative's marketing ability. Use of such marketing practices as

^{1/} For example, let Rank 1 have the value 5, Rank 2 have the value 4, ..., Rank 1 have the value 1, and "unranked" have the value zero. Then "improves fairness" has an aggregate score of 101 and "permits raw product commingling" has an aggregate score of 93.

loss leaders, preferred-customer discounts, and commodity price speculation would be unfair to certain members if the entire burden of any price discount were borne by those members. Although the risk-reducing aspect of pools was cited by many respondents, this aspect was not as important as the raw product commingling that pooling facilitates. Accounting cost savings, mostly associated with reduced need to allocate plant and administrative overhead to individual raw product classes, were included as only a minor advantage of pooling.

Table 17 shows that, although in one sense pooling improves the fairness of members' returns, in another sense pooling is perceived to reduce fairness. By a wide margin, respondents felt the major problem with pooling is the "subsidy" that growers of high-profit crops provide to growers of low-profit crops. The second most highly ranked disadvantage is the consequent disincentive to produce high-profit crops or to achieve high raw product grade standards.

Surprisingly, some cooperatives said pooling increases members' income risks and accounting costs. The increases in risk may refer to growers of crops whose value is comparatively stable from year to year; these growers' returns could be destabilized if they were to participate in pools with crops of less predictable value. Increases in accounting costs may be caused by the difficulty of designing equitable bases for distribution of net returns in diversified, single-pool cooperatives.

Indeed, the most frequently mentioned methodological problem with pooling was accurate estimation of raw product market values used to calculate grower pool shares. But cooperatives also were concerned with equitable methods of allocating overhead to multiple pools. To reduce such accounting problems, one firm indicated it was considering reducing the number of pools it operates. Most cooperatives said their members were reasonably satisfied with the number of pools operated and with the way pool returns are determined. Three cooperatives, however, said they were considering increasing the number of pools to reduce subsidization of lower-profit crops by higher-profit ones. There likely will be a modest trend toward use of more numerous pools in diversified cooperatives because the costs of multiple-pool accounting are being reduced through computerization.

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