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The importance of cost accounting

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Cost accounting is the most critical element in the function of the accounting/finance function of Iowa Select Farms. Coupled with the cost and productivity benchmarking that emanate from our budgeting process and production information systems, our cost accounting systems have become arguably one of the most important functions in our business.

To be sure, the swine industry is moving away from a production-driven, commodity business and more toward a value-added, consumer-driven industry. We are more and more focused on genetic improvement, carcass quality, and meat quality. We are more focused on the needs of the end consumer—not just the packer—and focused on evaluating the top line of the income statement as we assess profitability.

Though there is much attention paid to this focus on product improvement and improving earnings by enhancing the value of our product; it is clear that much of this earnings improvement accrues to the packer/processor and/or retailer. Also, as the industry has continued to modernize rapidly, there is less and less differentiation between the premiums which are being paid to producers with modern production systems. Though I fully support the continued efforts to improve product quality and better position pork in the world market, I believe we must place more focus on low cost of production so that we can:

- maximize profitability in our respective operations, and
- ultimately drive down the cost of our product in the meat case.

I believe that low cost production should be a critical goal in each of our businesses. As financial managers, I believe that our top priority is to ensure that we have systems in place to accurately measure production costs and cost drivers so that our operations have the tools to achieve this goal.

Importance of benchmarking

In order to measure our progress toward the goals of low cost production and our related goals of productivity and cost and earnings competitiveness, we turn to benchmarking techniques. It is important for us to bench-

mark our results with other companies in our industry and/or competing industries as well as benchmark with established internal goals and objectives.

External benchmarking

Comparing our results with those of others within our industry, I've found, can be very tricky. There is a surprising lack of standardization in industry definitions and cost accumulation. For example, I frequently hear people in the industry make statements like, "Our finishing feed efficiency in 1997 was 2.6." When I first started in this industry in 1993, a statement like that might cause me to believe that perhaps Iowa Select Farms was not the most efficient in our finishing operations. Now, of course, I realize that this statement means absolutely nothing, in and of itself. I need answers to several questions in order to assess the value of this information:

- What were in weights and out weights?
- Are dead and/or cull pounds included in the calculation?
- Were pelleted or meal rations fed?
- Most importantly, what was feed cost per cwt. gained?

"Pigs per sow per year" is another commonly-cited benchmark—and a key measure of production throughput. But what exactly is pigs per sow per year? Is this pigs born, pigs weaned, feeder pigs, or market pigs? Is it being computed on the basis of inventoried females or mated females? How is the gilt pool accounted for? Differing answers to each of these questions can yield significantly different results.

Though the industry has had such variations in these production standards, surely the application of generally accepted accounting principles in our management and financial accounting practices would result in more consistency. In 1997, I facilitated a roundtable discussion on cost accounting at the NPPC Financial Management Conference and conducted a survey of cost accounting practices in order to assess the degree of consistency among financial managers of arguably the more progressive producers in the industry. I found that inconsistencies in accounting practices have been every bit as prevalent as

inconsistencies in production benchmarks. The results of the survey can be found in the tables below.

Table 1 illustrates more of a classification issue than a costing issue because, under either method, aggregate production costs per animal should be similar. Some producers attempt to separately identify the cost of deaths and culls as separate line items on their financial statements, whereas others do not separately identify these costs. Iowa Select Farms is one of the minority of producers in this former category, as we believe it is useful to attempt to attach a cost to death and cull loss which, when compared to a standard cost for “normal” (e.g., target) death/cull loss, becomes an indicator of the economics associated with this key production driver.

The real issue here is whether culls are considered spoilage in the production process which is oriented toward producing top market hogs or whether the production process is oriented to producing pounds of pork for outside sale, without distinguishing between top market sales and cull sales (**Table 2**). Again, Iowa Select Farms is part of the minority here. We view culls as normal spoilage in the production process and therefore include proceeds from the sale of cull animals as an offset to production costs.

As you can see, more than half of the individuals responding to the survey indicate the opposite accounting treatment for breeding stock cull revenues as the majority employ for cull nursery and finishing animals (**Table 3**). I think this is because it is a more clear-cut issue. Whereas nursery and finishing animals are the product of the production process and, in fact, the product of the breeding stock “machine,” breeding stock is accounted just as a machine—depreciated to its salvage value. Given that depreciable costs of breeding stock are treated as production costs, it seems clear that salvage value (cull proceeds)

TABLE 1: Accounting treatment of death/cull loss (animal cost) for nursery and finishing animals

Quantify Expense Amount for Death/Cull Animals; Maintain G/L Account for These Expense Items	15
Do Not Identify Separately; let “Fall Out” by Applying Costs only to Animals On Hand; no Death/Cull G/L Accounts Maintained	45

TABLE 2: Accounting treatment of cull revenue for nursery and finishing animals

Treated as Revenues, a Component of Gross Sales	51
Treated as a Credit toward Production Costs (Reduction of Cost of Sales and Inventory)	12

should also be reflected as a credit to production costs. However, half of respondents to the survey do not treat breeding stock cull revenue in this manner.

This issue is not as clear-cut, and I must admit, points out an inconsistency in Iowa Select Farms’ rationale for accounting. If you ask the question, “What is the primary goal of the Iowa Select Farms’ herd multiplication system?” the answer is—to produce breeding stock. Given the rationale which I described earlier for nursery and finishing cull revenue, that would dictate accounting for the gross profit on barrows and non-select gilts from the multiplication system as a reduction in the costs of those gilts selected for breeding. However, if you ask the question, “What is the primary goal of Iowa Select Farms’ production system?” the answer is—to produce a top market hog. This is why we treat the sale of barrows and non-selects from our multiplication system similarly to the sales and cost of sales of top market hogs from our commercial production system. The majority of survey participants use this same accounting treatment (**Table 4**).

This is an area where the majority of survey respondents are simply not complying with generally accepted accounting principles related to the classification and financial presentation of this item (**Table 5**). According to Accounting Research Bulletin 43, “as applied to inventories, cost means in principle the sum of the applicable expenditures and charges directly or indirectly in-

TABLE 3: Accounting treatment of cull revenue for breeding stock

Treated as Revenues, a Component of Gross Sales	26
Treated as a Credit toward Production Costs (Reduction of Cost of Sales and Inventory)	28
Treated as “Other Income: Gain/Loss on Sale of Fixed Assets”	2

TABLE 4: Treatment of gross profit on market animals (barrows and non-select gilts) from multiplier units

Recognized as Ordinary Revenue and Cost of Sales	35
Recognized as a Reduction in Breeding Stock Costs	9

TABLE 5: Accounting treatment of transportation costs to market

Treated as a Component of Cost of Sales	31
Treated as a Selling Expense, as a Component of Net Sales	15

curred in bringing an article to its existing condition and location. Selling expenses constitute no part of inventory costs.”

Given that freight insurance is similar in nature to transportation costs to market, it is interesting that the majority of survey respondents (**Table 6**) are treating check-off fees properly as a selling expense, though 44% are reflecting NPPC fees as part of total production costs.

Though these expenses are not on-going, the differences in accounting practices can yield significantly varying results. Startup or excess/idle capacity costs can be significant for a new farrow-to-finish production unit. Iowa Select Farms expenses those costs in excess of standard costs at full capacity as “excess capacity costs.” Eighteen of the 42 survey respondents also expense such costs currently (**Table 7**). However, the majority of producers responding capitalize these costs and amortize them over some period in the future. Accordingly, these costs are likely a component of ongoing production costs for such operations, whereas other producers—like Iowa Select Farms—will not have such ongoing costs.

These averages seem to be reasonable in terms of assessing each asset’s estimated useful life (though a 17.6-year depreciable life on modern production buildings is probably significantly less than economic useful life); however, variability among respondents to the survey were significant in some cases (**Table 8**).

Though a “pound” or “cwt.” unit of measure would seem to be the most appropriate measure in order to assess

TABLE 6: Accounting treatment of freight insurance and NPPC fees

Treated as a Component of Cost of Sales	19
Treated as a Selling Expense, as a Component of Net Sales	24

TABLE 7: Accounting treatment for production unit startup costs

Capitalized as Inventory Cost, Expensed as Cost of Sales for first group(s) of animals	9
Capitalized and Amortized, Expensed as Excess/Idle Capacity Costs	24
	9

TABLE 8: Depreciation estimated useful lives (averages)

Production Buildings	17.6
Production Equipment	10.8
Sows	2.5
Boars	2.4

TABLE 9: Unit of measure most emphasized in cost reporting

Per head	19
Per pound	15
Per cwt.	16
Per carcass wt.	2

equivalent units of production, it is interesting that most survey respondents still use “per-head” measurements, primarily (**Table 9**). Given the industry shift to the lean hog contract and focus toward selling meat versus live animals, we should also be quantifying key production variables on a “carcass-weight” basis—perhaps not as our primary unit of measurement, but as a secondary measure. However, it is more difficult to do this since our production systems measure live weight gain throughout the production process.

Based on these survey results, it is evident that cost accounting practices vary widely. There are additional comparability issues which exist—for example the pricing of internally-produced commodity inputs for the integrated grain farmer, and labor expense ascribed to the owner/operator of a swine production enterprise. Certainly, geographic differences can result in varying commodity costs which may not be indicative of production efficiency or performance. Similarly, the use of contracted production versus ownership of production facilities can have significant cost implications.

Given these factors, it is challenging for a swine production company to meaningfully compare its production costs to that of other production companies or summaries which are published from time to time by the administrators of various record-keeping systems. Yet I believe that benchmarking is an important tool in achieving success in our industry. If we are to have meaningful benchmarking, we surely need to have consistency in methodology—or to the extent that there are inconsistencies, we should be able to deal with them if we have identified them. That is why I have been very supportive of the efforts of NPPC to adopt standard production, management accounting, and financial standards, and have participated actively on the Management Accounting Committee. The work of these committees will definitely be a work in process as the methodologies are employed. I encourage the input of all financial manager’s in the industry in providing input on the initial standards which have recently been released.

Internal benchmarking

Cost accounting systems, coupled with production information systems, provide a swine production company with the basis for internal benchmarking. In conjunction with

the survey conducted during the 1997 NPPC Financial Management Conference, we also asked participants to describe their cost accounting systems; the results are shown below (See **Tables 10** and **11**).

Valuing swine inventories at market is not in accordance with generally accepted accounting principles, which dictate the valuation of inventories at the lower of cost or market. More importantly from a management standpoint, valuing pig inventories at market precludes a producer from doing any meaningful cost analysis given that the hog market price variable will skew any production costs compiled.

The two most widely-used cost accounting systems in the industry are a job/group process costing system and a standard process costing system.

Job or group process costing system

Inventory costs are aggregated by production process (e.g., breeding, nursery, finishing). Direct, variable production costs are assigned directly (actual costs) to a given group's inventoriable cost. Indirect, fixed costs are applied to the group's inventoriable cost based on cost standards established. All costs are capitalized into inventory and expensed when the group is sold. Note by the results of the survey that this costing system is most widely employed in nursery, finishing and wean-to-finish processes, where all-in, all-out production results in separately identifiable groups are more conducive for cost tracking. Note that 14 of 57 companies responding to the survey also use this cost system in breeding/gestation/farrowing. Though I am not familiar with this approach, I presume that groups are created by the breeding function. I would think that tracking actual group costs in a sow operation would be extremely difficult and probably cost-prohibitive. Therefore, I suspect these producers are using a standard costing system which aggregates costs by group.

Advantages of this costing system include:

TABLE 10: Cost accounting system—breeding, gestation, farrowing

Standard Cost System	37
Job Cost or Group-Based Cost System	14
Inventory Valued based on Market	4
Other	2

TABLE 11: Cost accounting system—nursery, finishing, wean-to-finish

Standard Cost System	28
Job Cost or Group-Based Cost System	29
Inventory Valued based on Market	3

- Accuracy. Using actual costing for much of the production inputs results in improved accuracy of direct/variable cost accumulation and capitalization to inventory.
- Capitalize (into inventory) production efficiencies or inefficiencies. This could be considered an advantage or disadvantage, depending on management's orientation, and is in contrast to a standard costing system which capitalizes only standard costs and recognizes production efficiencies or inefficiencies during the periods incurred.

Disadvantages of this costing system include:

- Benchmarking adjunct to costing system. Since standard costs are not used, line-item benchmarking is typically limited to close-out periods versus accounting periods, unless an adjunct system is in place to track costs compared to expectation during interval periods (e.g., financial accounting periods). For wean-to-finish and finishing groups, this may result in getting cost benchmarking information every four to six months versus on a more frequent basis.
- More burdensome ongoing accounting. Tracing each production cost not only to a particular farm, but to a particular building or group, creates additional data entry requirements.
- Capitalize (into inventory) production efficiencies or inefficiencies. As indicated above, this may be considered an advantage by some.

Standard process costing system

Inventory costs are aggregated by production process (e.g., breeding, nursery, finishing). Production costs are applied to inventory based on productivity and cost standards established. Variances between actual and standard costs are expensed currently. Standard costs applied to inventory are expensed when the animals are sold. Note by the survey results that this system is the most widely used in the breeding/gestation/farrowing process (where accounting for production costs by group is impractical), but is also employed about as widely as job/group process costing systems in nursery and finishing operations.

Advantages of this costing system include:

- Benchmarking to line-item standards on monthly basis. Since standard costs are established for periods of time or weight gain, monthly financial statements reflect line-item comparison of cost items to such standard costs, which facilitates benchmarking of production costs for each accounting period.
- Expense currently all production efficiencies or inefficiencies. Since only standard costs are capitalized into inventory, based on production targets, any costs which are in excess of standard (reflecting pro-

duction inefficiencies) are expensed currently whereas any costs which are lower than standard costs (reflecting production efficiencies) are also recognized currently.

Disadvantages of this costing system include:

- Standard versus actual direct cost accumulation. This results in less accurate production costs capitalized into inventory as compared to a job/group costing system.
- More burdensome to establish systems. This requires more effort to set up and maintain accurate standards, and to establish systems to project weight gain and aggregate standard costs. However, once established, data entry requirements are less than those required in a job/group costing system.
- Expense currently all production efficiencies or inefficiencies. This might be considered a disadvantage by some.

Activity-based costing

Using activity-based costing is important in determining accurate costing under both a standard process costing system and a job/group costing system. Under a standard process costing system, all production costs are applied to inventory using computations based on standards established. Indirect, fixed costs must also be applied based on such methodology in a job/group costing system. In order to provide accurate costing—and benchmarking—these computations of standard costs must accurately reflect line-item production costs for the interval being measured.

Activity-based costing is a means of costing which enhances the accuracy of standard costing and, as importantly, identifies an organization’s key drivers to such costs, which directs an organization to manage such drivers. The “drivers” for a particular cost are the activities which cause costs to be incurred and/or the resources which are consumed to create such cost—in short, those activities and/or resources which “drive” the per-cwt. cost for the particular type of expense. Using activity-based costing, cost drivers are identified and quantified in applying production costs to inventory.

Applying standard costs accurately is first dependent on the ability to measure a standard quantity of production for a given time period. In swine production, this entails developing an accurate matrix for growth (rate of gain) performance, which is necessary to quantify cwt. produced during given intervals of time (e.g., financial statement periods) under each production process. For individual production costs, it is then necessary to identify key drivers.

Variable costs, those costs which vary depending on production quantities, are typically driven by such production quantities, overall production throughput, and individual item costs. Certain of the swine production variable costs and drivers are shown in **Table 12**.

Fixed costs are those costs which are unchanged regardless of production quantities. Accordingly, the drivers of fixed cost are production throughput and individual item costs. Throughput drivers include pigs/sow/year (and the productivity components of this measure), animal stocking densities, growth performance (rate of gain matrix) and death/cull loss. Examples of additional cost drivers for certain fixed costs are shown in **Table 13**.

The Iowa Select Farms cost accounting system

At Iowa Select Farms, we use an activity-based, standard cost accounting system tied closely to our production information systems, which provides the basis for our

TABLE 12: Examples of variable costs

Variable Costs	Cost Drivers
Feed	Feed Efficiency Matrix Death/Cull Loss Input Costs Manufacturing, Delivery Costs
Medications	Maintenance Protocols Herd Health Medication Costs
Transportation	Distances Cwt./Load Trucking Costs
Manure Handling	Feed/Water Efficiency Hauling Distances Application Methods Handling Rates

TABLE 13: Examples of fixed costs

Fixed Costs	Item Cost Drivers
Labor	Wages Benefits Employment Taxes Bonus Plans Staffing Levels
Facility Costs: Depreciation	Capitalized Costs Depreciable Lives
Lease/Contract Utilities	Lease/Contract Rates Utility Rates Usage (many drivers of usage)
Insurance Property Taxes Supplies	Insurance Rates Tax Rates Individual Item Costs Usage

benchmarking. Our system is managed under the following process:

1. **Budgeting Process.** We prepare a zero-based, line-item budget annually which represents our operating and financial goals for the coming year. Key productivity variables are the primary drivers of this process. Commodity prices and other variable and fixed costs are also budgeted.
2. **Establishing Standard Costs.** Our productivity and cost goals from the budgeting process become the basis for establishing standard costs for each production expense on a farm-by-farm basis. Also important in this process is establishing the drivers for each cost, which provide the basis for applying such costs to inventory as hogs are raised through the production process.
3. **Adjusting Standard Costs.** Standards are adjusted monthly for actual feed ingredient costs. To the extent that there are significant changes in certain productivity and/or cost drivers during the year, standard costs may also be adjusted; however, this is rarely done given that the annual operating plan (budget) is a critical component of assessing company performance, and Iowa Select Farms employs a fixed (versus flexible) budgeting process.
4. **System to Measure Production Quantities.** We have developed software which, tied to PigChamp, quite accurately generates a perpetual inventory on a cwt.-on-hand basis. The system also applies standard costing based on established standard costs and the cost drivers established for each expense line-item for the particular phase of production. For example, feed

efficiency and rate-of-gain matrices with five-pound weight breaks are incorporated, among other relevant cost drivers, to allocate benchmark costs for the particular stage of production.

5. **Benchmarking.** Monthly financial statements are prepared departmentally and on a farm-by-farm basis which indicate line-item production costs compared to standard costs. Key productivity information (the primary "drivers") is also incorporated. Each farm financial statement has "Actual," "Standard," and "Variance from Standard" columns, which, along with productivity drivers, provide the basis for our monthly benchmarking of production costs by line item.
6. **Implementation.** Monthly review of farm financial statements with production supervisors and farm managers is imperative in order for the benchmarking tools to have an impact on productivity and cost management.

Summary

Given that the magnitude of product differentiation and revenue enhancement is lessening in the domestic pork industry today, it is more critical than ever to focus on low-cost production. In order to continue to strive for low-cost production, it is imperative for swine production companies to be able to accurately measure costs and identify and manage the key variables which drive costs. Production information systems and cost accounting systems are critical tools to the successful pork enterprise.

