A Case Study of Tracking Expenses by Commodity at Widget Farmers Cooperative

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Abstract

Growing pressure from competition, shrinking markets, and poor economic conditions are making many agribusinesses look for ways to maximize profits and remain healthy. Widget Farmers Coop (WFC) is a large retail agricultural supply cooperative with 12 locations in two states. It has over 40 million dollars in annual sales each year since its creation in 2004. WFC management would like to track expenses and identify areas of the business that are profitable and capitalize on them, as well as identify areas that are not profitable and realign or eliminate them. Using Excel, the WFC regional accounting team designed Cost Allocation Tool 1 (CAT 1), a spreadsheet to allocate expenses based on product category both by site and as a whole for WFC. Cost Allocation Tool 2 (CAT 2) was then developed to further integrate and allocate costs by manufacturer and to identify which manufacturers were profitable and which were not. The goal of both spreadsheets was to identify areas where expenses could be reduced or better managed. Both tools performed as expected; however, because of labor requirements for data entry and the number of assumptions made, the CAT 2 was not practical at the current time. CAT 1, on the other hand, was feasible. Management now has a tool to identify and manage expenses.

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I. Introduction

Agribusiness, especially the retail input supply sector, is growing and changing constantly. Increasing input costs, decreasing margins, fewer customers, and growing competition have played a major role in shrinking profitability of agricultural suppliers, leading to consolidation in the industry. Improved input technology (i.e. genetically modified seed, fertilizer, and pesticides) has increased the operating cost for producers while at the same time improving yields. Today's producers need to better market and manage their operations to remain profitable. In addition to rising input costs, there are fewer suppliers trying to service a smaller number of customers. Advances in production equipment have allowed farmers to cover more acres in less time as well as increase the distance they are willing and able to travel to produce a crop. The advances in technology for both inputs and equipment and the need to spread the cost over larger acreages to be profitable, has lead producers to increase operation size to take advantage of economies of size. The number of tillable acres is not growing, and in many cases in West Tennessee, it is shrinking. According to the United States Department of Agriculture, the amount of cropland in the United States fell from 7,451,482 acres in 1997 to 6,047,348 acres in 2007 (USDA, 2011). In addition to having fewer, but larger customers, the size and complexity of agribusiness retailers is changing. In Fayette county Tennessee, which is 30 miles east of Memphis and a relatively rural county, there are four agricultural suppliers that have brick and mortar locations, and up to seven that call on customers. Intense competition paired with higher input costs has forced retailers to decrease their margin to remain competitive.

Widget Farmers Cooperative (hereafter WFC) is a retail agricultural cooperative in West Tennessee that is currently facing these issues. The National Council on Farmers Cooperatives explains, “Cooperatives are businesses owned and controlled by the people who use them.’’ The difference between a cooperative business and a corporation is that the members of that cooperative are the owners, and by way of a board of directors control the overall direction of the “Coop” (NCFC, 2011). Because the cooperative is controlled by its members, its successes and failures directly affect its customers. Cooperatives can be created to provide their members with more bargaining power, to reduce operating costs, provide a form of risk management, and obtain products or services competitively. Table 1 was compiled from the National Council of Farmers Cooperatives website, and lists the types of cooperatives, and their purpose.

Table 1. Description of the four major types of agricultural cooperatives

Type of Cooperative	Purpose
Marketing cooperatives	Handle process and market virtually every commodity grown and produced in the United States.
Bargaining cooperatives	Bargain to help their farmer members obtain reasonable prices for the commodities they produce
Farm supply cooperatives	Engaged in the manufacture, sale and/or distribution of farm supplies and inputs, as well as energy-related products, including ethanol and biodiesel
Credit cooperatives	Include the banks and associations of the cooperative Farm Credit System that provide farmers and their cooperatives with a competitive source of credit and other financial services, including export financing.

There are over 2500 farmer cooperatives in the United States, which made 191.1 billion dollars in sales in 2008 (NCFC, 2011). United States cooperatives employ 250,000 people, and supply and marketing cooperatives make up at least one third of both total farm sector revenue and input sales (NCFC, 2011). Large corporations that are actually cooperatives include Land O'Lakes, Sunkist, Ocean Spray Cranberries, Riceland Food, and Staplecotn (NCFC, 2011).

WFC Background

WFC is a retail agriculture supply cooperative that was created when four separate cooperatives merged. The merger took place to give the WFC a competitive advantage and larger market share in its trade area. A few years, later WFC grew by merging with another coop in the area. The growth continued into new areas where cooperatives were either nonexistent, or areas where the existing coop could not service its customers adequately. WFC has 12 locations in two states. The territory covered by WFC is 139 miles north-south and 110 miles from east to west. Before the merger, most of the five original cooperatives were at some point servicing some of the same customers, and competing against the same multinational corporations as well as each other. By merging, they transformed from five financially stable cooperatives sharing customers and competing with each other, to one large coop servicing these customers and competing in the marketplace more efficiently. One of the main reasons these cooperatives were able to merge is the similarity between the operations. All of the original cooperatives were healthy, service based cooperatives whose customer makeup was very similar. Row crop producers were responsible for the majority of the business as is still the case with WFC. WFC has equipped itself to be a major retail supplier of chemicals, seed, fertilizer and a number of other services to row crop producers. While each store does sell feed and other farm supplies, the vast majority of WFC's revenue derives from row crop producers. In 2010, WFC sales were $65,536,180. Of

those 65 million dollars, $53,490,418 was generated by seed, chemical, fertilizer, and fuel sales. The majority of agronomy sales are performed by one of 10 outside salesmen. Each location has an outside salesman, a fertilizer plant manager, and an area manager who spend the majority of their time catering directly to row crop producers.

Because WFC is such a new cooperative, and because it is unlike any other coop in the area, many of the business practices and governance of the coop are unique compared to other cooperatives in the state. The coop has a ten member board of directors, consisting of at least 1 board member from each original coop. The general manager (GM) answers directly to the board of directors, and has managers under him that either manage a particular geographical area or a sector of the business. To avoid micromanaging, the GM allows all decisions for a given location to be handled by that location manager, as long as they fall in line with the general direction of the coop. WFC is a member cooperative of a statewide federated coop, which also has memberships in other cooperatives as well.

All businesses, including WFC, must remain profitable to satisfy stakeholders, which is difficult when faced with complex problems. One major problem WFC faces is that while margins have decreased, expenses have increased. The same fuel the farmer uses to produce a crop, WFC uses to service its customers; thus the higher fuel costs not only affect the customer, but the supplier as well. WFC can increase its market share and draw in more revenue by expanding into new territories; however, the increase in sales will require more resources. Using more resources will increase the cost of doing business and will affect the profit margin. If WFC prices its products higher than the competition, the margin may increase, but the revenue will most likely decrease because the customers will likely substitute cheaper products from competitors. In row crop production, many chemicals have a generic form, which can be used for

the same purpose as the branded chemical. All the retailers sell the same branded material from major manufacturers; however each one has off-label chemistries in their own brand. When pricing chemicals, management must take into account comparable generics that are on the market as well as the targeted margin. The gross margin is the money that a company makes once the cost of goods sold (COGS) is subtracted from the revenue drawn from sales. The operating margin is the money a business has after the expenses are subtracted from the gross margin. While selling more products and maximizing margin on single products is one viable way to ensure that the business stays profitable, reducing operating expenses is another way to increase the operating margin. By taking initiatives to lower expenses, a business is proactively trying to increase its operating margin.

Objectives:

1. Develop a management information tool that will allow WFC management to track expenses by allocating costs to certain departments.
2. Develop a management information tool that will allow WFC management to allocate expenses to specific categories of each department and identify the profitability of manufacturers' products.

II. Literature Review

Before a business can begin to lower its costs, it must first identify and connect them to a cost center. It must also determine if the expenses are necessary. WFC currently has a basic accounting system where expenses are aggregated to give one large expense pool. WFC management wants to take the costs incurred in everyday operations and associate them to a specific business segments. This is a new concept for a business this size and is similar to a manufacturing costing system called activity based costing (ABC). According to Babad and Balachandran (1993), ABC is a superior method for obtaining more accurate product costs, and is a means of better factory management. ABC also allows a business to analyze which practices, customers, and vendors are more or less profitable (Babad and Balachandran, 1993). ABC emerged early in the 1980s and had initial success as it was recognized as a new and valuable costing system. ABC measures the cost drivers and resource usage of the various processes it takes to produce a product or service (Ramasamy, 2004). Cost drivers are factors that cause the cost of an activity to change (Ramasamy, 2004). ABC was designed, in the beginning, for large manufacturing companies that had many different processes or steps required to produce a product. The steps involved in activity based costing as explained by Ramasamy (2004) are:

- Identify the major activities that take place in an organization:
- Assign costs to that activity
- Select appropriate cost drivers
- Assign the cost of the activities to products

Traditional cost-accounting systems maintain all overhead costs in one pool and give equal weight to all activities and costs in that pool (Babad and Balachandran, 1993). Some firms can track every activity while others group everything together. Each firm must find the most efficient and optimal number of cost drivers. Ittner et al. (2002) identified both strategic benefits and operational benefits to adopting an ABC system. The strategic benefits occur from improved information on make versus buy, product mix, outsourcing, and other strategic decisions. On the other hand, the operational benefits arise from a better understanding of the production economics and cost drivers, which include lower costs, improved quality, and reduced manufacturing time (Ittner et al., 2002). An ABC system can help identify areas of improvement by distinguishing value added, and non-value added processes and the cost associated with these activities. By identifying these activities the ABC system can indicate where improvements can be made and how many resources to allocate for the improvements (Ittner et al., 2002).

Datar and Gupta (1994) acknowledge that there are many studies written that focus on ABC, but they argue that there has been little analysis as to why an ABC system leads to more accurate product costs. Multiple cost pools and cost drivers may better illustrate a cause and effect relationship between resource consumption and product cost but more detailed costing systems such as ABC may lead to other errors, thus making its adoption less than beneficial (Datar and Gupta, 1994).

When dealing with ABC, it may be helpful to define aggregation and specification. Aggregation is defined as a group or mass of distinct or varied things; collection into an unorganized whole, and the state of being so collected (Datar and Gupta, 1994). Specification is defined as an act of making specific. Cost allocation includes both aggregation and specification. Costs are first aggregated into an unorganized group of like things such as rent,

property taxes, building maintenance, utilities. The costs are then divided into more specific groups

Estimation, in the simplest form, is an educated prediction or guess. Because it is subjective, estimation is subject to errors. ABC systems are no exception. There are three types of errors in ABC: specification errors, aggregation errors, and measurement errors. Specification errors occur when methods that classify costs to products fail to reveal the demands placed on resources by individual products. Costing systems have typically allocated overhead costs to products on the basis of volume-based drivers. If the resources to produce a product do not vary with the volume of products produced, allocating costs in this manner will not accurately portray the demands an individual product's production may have on the overhead resources (Datar and Gupta, 1994).

Aggregation errors transpire when a resource's units and costs derive a single allocation rate after being aggregated over heterogeneous activities (Datar and Gupta, 1994). This essentially means that if costs of a similar type, such as tear down costs, are put into one cost pool and then assigned to each product there is an opportunity for error to occur. Look at three different products (product 1, product 2, and product 3) and assume each takes the same amount of time to tear down, but product 1 costs $12/hour, product 2 cost $15/hour, and product 3 cost $10/hour. If each product requires three hours for teardown, then under aggregation, the total teardown cost for each individual product will be an average of the three tear down costs and will not be a true reflection of what the tear down costs actually are.

Many firms would like to adopt more detailed costing systems to try and reduce specification and aggregation errors; however there may be a tradeoff that leads to an increased

number of measurement errors (Datar and Gupta, 1994). It is possible that measurement errors arise due to the lack of measurement guidelines or lack of information on the requirements of certain duties. Accounting personnel may not be informed of how long it takes to setup a certain production line; therefore they cannot make an accurate decision on where costs are allocated and how much of the costs are allocated to a product. A firm's product cost information does not necessarily improve because it refines its costing system (Datar and Gupta, 1994). According to Ittner et al. (2002), ABC adoption is associated with higher quality and manufacturing efficiency while reducing manufacturing costs, but there is no significant association with return on assets. The objectives of costing systems sometimes require different approaches, techniques, and philosophies (Beckett, 1951). Many companies realize that their cost systems are inadequate for today's competition (Kaplan, 1998). Cost systems now need to concentrate on three different functions (Kaplan, 1998):

- Inventory valuation for financial and tax statements
- Operational control - providing managers information on labor and resources used in a production period
- Individual product cost measurement

Activity-based costing is an effective cost allocating method that has been expanded to a practice called activity-based management. Most ABC information available is from the manufacturing or government sectors, but most of the principles cross over to retail businesses. Rather than examining the resources it takes to produce a product, the goal of using an ABC type system in a retail setting would be to measure the resources needed to sell a product or group of products. Tracking every product in a retail business would be impossible, thus it would be necessary to group the products into similar groups. In the case of WFC, the groups are seed,

chemicals, fertilizer, and feed. These groups make up a majority of sales for WFC and require most of the resources used throughout the year. Sales of other items make up too small of a percentage of sales and resources used to warrant any added cost to identify and control any problems.

III. Materials and Methods

The goal of WFC management was to track overhead and cost of goods sold (COGS) by department, and then, if possible, to track profitability by manufacturer. The first step was to determine the categories. As previously mentioned, the majority of WFC's revenue derives from sales of chemicals, seed and fertilizer, thus only these categories were included. Because feed, hardware, and other categories make up such a small percentage of revenue, WFC management did not include them in the management tool. The three departments were chemicals, seed, and fertilizer.

All sales and accounting information was taken from MerchantAg. MerchantAg is the point of sale (POS) system WFC uses; its companion software system, called EFC Financial, was utilized as well. Both programs are created and maintained by EFC Systems, a software company based in LaVergne, Tennessee. MerchantAg is the POS software that tracks sales, inventory, customer information, and product information, and is primarily used by sales personnel in the store and sales management to track sales and customer information. EFC Financial is used by office staff and the accounting department to pay bills, allocate funds, track expenses, and other financial duties. The third program used in this study was Microsoft Excel 2007. Excel is a spreadsheet program capable of performing an array of functions. The spreadsheet layout was designed to allow a person to come in after the fact and build in simulations, if the need arises.

The general manager of WFC was consulted and he requested a specific format for the presentation of the information. Regional accounting, developed a tool to allocate costs to a

specific commodity for WFC, based on the general manager's request. The regional accounting tool was called Cost Allocation Tool 1 (CAT 1) and it was the basis for Cost Allocation 2 (CAT 2). CAT 1 allocates cost to different departments (chemicals, fertilizer, and seed) and contains an Excel worksheet for each location as well as a consolidated worksheet for WFC. CAT 2 takes each department and subdivides it by manufacturer for each location. A layout for the spreadsheet was developed and the template was built. Where numbers had to be entered manually, cells were not protected and identified by shading them green. Once the structure was developed, the template was built, and the information was then retrieved from MerchantAg using a sales summary report and a variance report. The general manager was updated and consulted regularly during the development of CAT 2. All of the figures come directly from MerchantAg, the point of sale and financial software that WFC uses to operate, and are for the 2010 fiscal year which runs from August 1, 2009 to July 31, 2010.

IV. Results

To track expenses in a new way, it is important to have an understanding of the current accounting method. In its simplest form, the standard accounting method for WFC is to subtract cost of goods sold (COGS) from revenue to obtain the gross margin. Once the gross margin is found, any expenses that were assigned to that particular category are subtracted, giving the operating margin. In this particular method there is no way to account for costs such as depreciation on equipment, rent, utilities, wages, etc.; all of those costs are subtracted as expenses.

Upon the instruction of WFC's general manager, the regional accounting department designed a spreadsheet to allocate costs to different departments in WFC. This spreadsheet is a tool that is used to organize expenses and revenue and associate them to the appropriate department. Looking at the operating statement of WFC and looking at this spreadsheet, the information is the same; however it is presented in a different way. From a legal standpoint, a business structure standpoint and a management standpoint, WFC is one cooperative, meaning it is rare to analyze a store as a single entity. CAT 1 is designed with one worksheet for each location, to allow each store manager the ability to analyze his expenses, as well as a consolidated worksheet for WFC, in which all the numbers from each location are totaled. CAT 1 was not developed to track expenses and sales by site and manufacturer, which is done by CAT 2. WFC management's goal was to determine the economically feasible level of tracking and allocating costs.

Income

Table 2 shows the total revenue for WFC. Sales are the dollars generated from the products that fall within each category. Cost of Goods (COGS) is the cost of the products that were sold. WFC paid $15,457,080 for the fertilizer products that were sold. The row beneath COGS is assigned to variances. Variances are any events that change the COGS. The goal of any operation is to have no variances, but if there are to be variances, it is best for the variance to be a positive because it is added. A negative variance would add to the COGS whereas a positive variance would subtract from the COGS. Variances include any type of inventory adjustment that is not a sale and manual value changes of products that are either old or were received incorrectly. A positive variance would occur when inventory is added through some type of an adjustment, such as an inventory count. A negative variance could occur when damaged product is written off and removed from inventory.

Table 2. Sales and margin information for WFC 8/1/2009-7/31/2010

	Fertilizer	Seed	Chemicals
Sales	18,741,310.00	9,045,000.00	12,918,372.00
Cost of Goods	15,457,080.00	9,273,528.00	12,477,867.00
Variances	396,856.00	(489,046.00)	4,464.00
Gross Margins	2,887,374.00	260,518.00	436,041.00
Rebates	0.00	351,181.00	2,861,212.27
Internal Freight	96,105.89	4,045.60	0.00
Purchase Discounts	1,087.23	721.22	1,225.34
Gross Margins after Rebates	2,984,567.12	616,465.82	3,298,478.61

Equation 1 shows how the gross margin is calculated:

$$Gross\ margin\ =\ sales\ revenue - COGS\ +\ variances \qquad \text{[Equation 1]}$$

Any rebates that are given are added to the gross margin. Rebates are often given by manufacturers to either promote selling their product or as an incentive for reaching certain sales figures. In general, rebates are not given for fertilizer, only for chemicals and seed. Internal freight is the next expense. Internal freight is most often associated with fertilizer products, and is a preset cost per unit for a product when WFC uses its own equipment to haul that product. Purchase discounts are similar to rebates, but are paid based on the amount of product purchased, the time frame in which it was purchased, or a combination of both. The gross margin after rebates is the number on which the rest of the spreadsheet's calculations are based. Equation 2 is used to calculate gross margin after rebates.

$$Gross\ Margin\ after\ rebates \qquad \text{[Equation 2]}$$
$$= Gross\ Margin\ +\ Rebates\ -\ Internal\ freight + Purchase\ discounts$$

Table 3 is the other income section of the spreadsheet and is separated into three different types of income. Direct service income is income resulting from WFC providing a service to the customer, which can be directly attributed to a department. Fertilizer spreading income, for example, can only be associated with fertilizer, so the income is directly allocated to the fertilizer category. The indirect service income is not allocated directly to a category. The indirect service income total for each category is calculated by taking the total indirect service income for WFC and allocating it based on a percentage of sales for each category. Total other income is another indirect income source that is made up of multiple income sources that cannot be directly associated with a category; thus they are allocated by percentage of sales as well.

Table 3. Income from various sources for WFC from 8/1/2009-7/31/2010

	Fertilizer	Seed	Chemicals
Fertilizer Spreading Income	1,097,219.00	0.00	0.00
Spraying Income	0.00	0.00	244,627.00
Soil/Grid Testing	302,502.00	0.00	0.00
Service Truck Income	0.00	0.00	0.00
Tire Shop – Charges	0.00	0.00	0.00
Tire Shop – Labor	0.00	0.00	0.00
Small Engine Shop	0.00	0.00	0.00
Small Engine Labor	0.00	0.00	0.00
Equipment Rental	10,558.00	0.00	0.00
Pull Spreader Rental	52.00	0.00	0.00
Drill Rental	0.00	12,658.00	0.00
Trucking Income	0.00	0.00	0.00
Total Direct Service Income	1,410,331.00	12,658.00	244,627.00
Grinding & Mixing	0.00	0.00	0.00
Delivery Charges	1,745.10	1,775.51	2,956.18
Shop Labor	0.00	0.00	0.00
Trailer Rental - Cattle, etc	0.00	0.00	0.00
Miscellaneous Service Income	2,424.01	1,427.82	2,334.43
Finance Charges	0.00	0.00	0.00
Total Indirect Service Income	4,169.11	3,203.32	5,290.61
Vending Income	17.92	9.64	16.04
Interest Income	56,267.31	27,406.54	40,129.92
Commissions	61,868.62	29,761.74	43,017.52
Gain on Sale of Fixed Assets	26,614.81	12,345.19	19,058.97
Old Accounts Collected	10,104.36	5,426.66	9,032.36
Membership Fees	34.94	5.84	(4.94)
Returned Check Fees	416.68	209.06	315.99
Income From Voided Checks	0.00	0.00	0.00
Rental Income	1,422.52	695.78	1,109.32
Finance Charges	(167.40)	(84.73)	(95.57)
Miscellaneous Income	45.05	16.63	29.74
Patronage Refunds	106,468.66	51,384.30	73,388.77
Member Performance	12,253.65	5,913.90	8,446.43
Other Shared Income	0.00	0.00	0.00
Total Other Income	275,347.12	133,090.55	194,444.56
Total Operating Income	4,674,414.35	765,417.69	3,742,840.78

Expenses

Whereas Tables 2 and 3 represent the income sections of the spreadsheet, Table 4 shows the first part of the expenses: salary, benefits and other employee expenses. Before regional accounting began structuring the spreadsheet, WFC management analyzed each employee's day and decided what percentage of their time was spent in each category. That percentage of their wages and expenses was then allocated to that category.

Table 5 shows direct expenses. Similar to direct income, direct expenses can be directly associated to a specific category. Fieldsmen expenses are allocated by a percentage of sales; however, fieldsmen spend an equal amount of time selling chemicals, seed, and fertilizer, thus their expenses are easily tied to the correct category.

Table 4. Employee salaries and benefits for WFC from 8/1/2009-7/31/2010

	Fertilizer	Seed	Chemicals
Salaries	1670480.00	701641.50	916037.30
Social Security Taxes	109485.70	48655.91	60661.90
Unemployment Taxes	22168.94	9734.01	11954.43
Total Wages & Related Costs	1802134.00	760031.40	988653.60
Employee Retirement	98441.21	44370.49	56545.91
Employee Health Insurance	158805.10	69809.18	90559.89
Employee Life & Disability	20584.50	8988.50	11382.39
Employee Uniforms	4638.20	1988.47	2114.75
Total Employee Benefits	282469.00	125156.60	160602.90

Table 5. Direct expenses for WFC from 8/1/2009-7/31/2010

	Fertilizer	Seed	Chemicals
Fieldsmen Expense	10296.05	10296.05	20592.11
Tire Shop Expense	0.00	0.00	0.00
Soil Sample Fees	147396.00	0.00	0.00
Crop Scouting	0.00	0.00	0.00
Seed Cleaning	0.00	0.00	0.00
Rental Equipment Repairs	14112.00	0.00	0.00
Radio Repairs	800.00	0.00	0.00
Fertilizer Equipment Repairs	217998.00	0.00	0.00
Feed Equipment Repairs	0.00	0.00	0.00
Fuel Equipment Repairs	0.00	0.00	0.00
Trucking	264535.10	108409.90	190341.70
Trailer Expense	585.88	239.88	397.99
Loss on Contracts	0.00	0.00	0.00
Total Direct Expenses	655723.10	118945.90	211331.80

The values in Table 6 are administrative costs that are not assigned to a particular location; therefore they are distributed equally to each category based on percentage of sales dollars. Many of the costs in Table 6 cannot be allocated in any other way except by percentage of sales. Administrative expenses are required for the company as a whole, rather than an expense occurred at a single location.

Table 7 lists the indirect expenses. Like the indirect income, these expenses cannot be associated with a certain category, so they must be allocated by percentage of sales. The indirect expenses are the expenses that do not fit anywhere else, but because the spreadsheet is tracking every dollar that travels through WFC, it is imperative that they are included. Because the goal of the spreadsheet is to track costs, the indirect costs are grouped as specifically as possible. In Table 7, a zero means that no expenses were incurred for that category.

Table 6. Indirect administration expenses for WFC from 8/1/2009-7/31/2010

	Fertilizer	Seed	Chemicals
Director's Expense	7756.61	3763.88	5384.78
Annual Meeting Expense	645.41	311.49	444.88
Bank Charges & Fees	12470.81	6090.19	8773.17
Collection Expense	-1098.08	-519.15	-758.66
Bad Debt Expense	6143.94	2965.20	4235.00
Information Services	16943.64	8247.97	11815.10
Regional Accounting	22558.07	10887.00	15549.26
Auditing	5041.23	2412.45	3469.63
Fines & Penalties	514.01	223.19	292.90
Total Indirect to Admin	70975.66	34382.29	49206.13

Table 7. Indirect expenses for WFC from 8/1/2009-7/31/2010

	Fertilizer	Seed	Chemicals
Employee Expense	35845.06	14886.80	2592.16
Manager's Expense	8414.14	4018.37	6066.42
Advertising & Promotion	39357.76	19008.00	27645.92
Donations & Subscriptions	6007.79	3082.18	4608.61
Credit Card Fees	23030.27	10783.65	16405.53
CFS Fees	290513.60	153549.70	224354.30
Vendor Financing Fees	137.61	91.1870	90.90
Farm Plan Fees	128304.40	67258.66	83836.17
Flexplan Fees	0.00	0.00	0.00
Cash Over/Short	367.81	68.19	146.27
Insurance	124998.10	50293.70	80029.40
Licenses & Taxes	53963.59	24358.10	38032.03
Office Supplies	15299.72	7721.56	11548.04
Postage	2288.51	946.25	1350.20
Equipment Expense	0.00	0.00	0.00
Telephone	62636.94	29334.24	43708.02
Utilities	62221.69	31829.24	45005.68
Janitorial Services	1153.67	447.03	795.25
Security Services	518.21	200.68	307.03
Supplies	21063.18	11647.58	17913.74
Showroom Expense	50.01	49.31	82.84
Shop Expense	2997.43	1200.49	2049.60
Pallets	5582.23	3116.54	2555.79
Prior Period Adjustment	0.00	0.00	0.00
Building Maintenance	49988.71	21702.06	35209.57
General Equipment Repairs	39083.41	14415.64	20814.80
Forklift Expense	19701.63	10176.00	14987.45
Total Indirect by Department	993525.50	480185.30	703466.70

Bottom Line

Table 8 shows the bottom line for each category. Fixed expenses, such as rent, depreciation, and other costs that are not variable are totaled along with interest expenses on borrowed money to give the total expenses for WFC. Equation 3 is the formula to determine the total net income:

$$Total\ Net\ income = Total\ operationg\ income - total\ expenses \qquad \text{[Equation 3]}$$

CAT 1 allows each location to be examined independently, as well as WFC as a whole. This allows each location manager to identify areas with inflated expenses, as well as areas where the expenses are normal. To give WFC management the ability to identify costing issues at the brand level, CAT 2 was created. Each category (fertilizer, chemical, and seed) had its own worksheet, and each location was represented. The category spreadsheets were linked to the main spreadsheet in some instances; however, certain information was manually entered. Figure 1 illustrates how the hierarchy of the categories used to allocate costs by manufacturer in CAT 2.

Table 8. Bottom Line for WFC from 8/1/2009-7/31/2010

	Fertilizer	Seed	Chemicals
Depreciation	1190148.00	81704.45	229233.30
Property Taxes	43106.48	22352.32	37130.72
Rent Expense	81744.30	0.00	1189.70
Equipment Rental	80383.40	0.00	324.60
Total Fixed Expenses	1395382.00	104056.80	267878.40
Interest Expense	63694.98	31130.67	44092.31
Total Expenses	5263904.00	1653889.00	2425232.00
Total Net Income	-589490.00	-888471.00	1317609.00

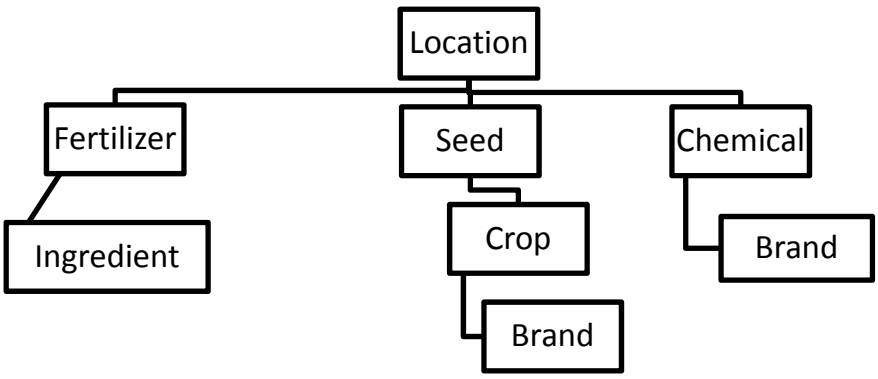

Figure 1. Allocation map showing hierarchy of categories used in CAT 2.

Table 9 illustrates the spreadsheet used in CAT 2. The total revenue for each brand was determined using Equation 4:

$$Total\ revenue = Sales - COGS + Variances - \left\{\frac{Total\ Expenses}{\%\ of\ Sales}\right\} + \left\{\frac{Total\ Brand\ rebate}{\%\ of\ Brand\ Sales}\right\} \qquad [Equation\ 4]$$

When calculating total revenue for fertilizer, rebate was replaced by income, due to the income derived from fertilizer application. The spreadsheet is not as complex as it is large; it covers 46 product categories and 12 locations. The bottom line for each manufacturer in each category gives the managers information on the expenses involved with selling a particular brand. An example of CAT 2 for three brands shows how total revenue was determined for each manufacturer (Table 9).

Table 9. CAT 2 showing chemical, seed, and fertilizer by site for WFC from 8/1/2009-7/31/2010

Brand	**ABC**		**Location A**	**Location B**
Total ABC Sales	$3,963,191.52	ABC sales	915341.77	63624.75
ABC Rebate	$1,160,377.00	% of Total ABC Sales	23.10%	1.61%
		COGS	875847.00	72856.40
		Variances	-17060.63	-8742.15
		Expenses	158058.17	25026.89
		Revenue On ABC	-135624.03	-43000.69
		Rebate	268001.57	18628.60
		Total Revenue on ABC Products after rebates and expenses	**$132,377.54**	**-$24,372.09**

Brand	**Field Seed**		**Location A**	**Location B**
Total FS Sales	$287,198.33	Field Seed Sales	24284.24	0.00
Rebate		% of Total Seed Sales	8.46%	0.00%
		COGS	17383.33	0.00
		Variances	-611.09	
		Expenses	3984.75	190.75
		Revenue On Field Seed	2305.07	-190.75
		Rebate	0.00	0.00
	Total Revenue	**Total Revenue on FS after rebates and expenses**	**$2,305.07**	**-$190.75**

Brand	**Bagged Mixed Goods**		**Location A**	**Location B**
Total Sales		Bagged Mixed Goods Sales	37,007.19	0.00
		COGS	25,848.94	
		Variances	-42.48	0.00
		Expenses	9,263.49	0.00
		Income	2,179.84	0.00
		Total Revenue on bagged mixed goods after expenses	**4,032.12**	**0.00**

V. Discussion

WFC management's goal was to have a method to track expenses more efficiently, to identify where expenses could be reduced, and to determine which product lines were responsible for most of the expenses. The current accounting system tracks expenses through General Ledger (GL) accounts; however, these accounts group many expenses together. Once an expense is entered into the GL account it is part of a large pool of expenses. If a forklift was rented for a three month time frame, specifically for treating seed, the expenses incurred for the forklift are put into "Warehouse Expense." Warehouse expense can encompass anything from duct tape to rewiring the lighting in the warehouse, so there is no distinction as to where the costs should go in the current system. The problem with using a tool to help allocate costs is that it would have to be done after the fact with the current system. Management's goal of being able to look at a specific sector of the business, analyze its profitability after all expenses were allocated was met; however the feasability of doing this annually or quarterly is questionable. If this was something that was done on a yearly basis, the man hours it takes to run the numbers traditionally and then input them into the spreadsheet may need to be examined. Checking this information on a yearly basis will not benefit WFC because there would be too much time between when a problem was identified, and when the solution could be implimented. For this type of system to be effective, it needs to be updated regularly, especially during the times when the majority of the business is done. The problem with doing this on a monthly basis is that it would require significant labor input to get these numbers.

Another option to make a CAT 1 or CAT 2 more successful would be to revamp the accounting system to allow expenses and income to be tracked by commodity more efficiently. This is not likely because the current computer system and accounting methods are shared by

cooperatives across the state and have been in place for a long period of time. The best alternative is a schedule that allows this spreadsheet to be reviewed quarterly. The information obtained from CAT 1 is very informative if the right decision maker is using it. Someone who is responsible for management of the business, and who knows where the numbers are coming from, can use this information to make informed decisions on these parts of the business.

Management's second goal was to track expenses to the manufacturer level and find out which categories were profitable and which were not profitable. While this goal was accomplished, using CAT 2 did not give as much insight as was expected. Tracking expenses by manufacturer required too many assumptions. Many costs and expenses were allocated by percentage of sales, which is feasible to do for a whole category; however it is not feasible when looking at information by brand. This assumption basically reinforces the idea that if WFC sells more of product A than product B, it used more resources, thus encountered more expenses to sell product A. A simple example of why this is an incorrect assumption is liquid nitrogen. WFC orders liquid nitrogen fertilizer which is delivered directly from the manufacturer to the farm, meaning that WFC incurred very few expenses selling that product. If WFC sold $10,000,000 worth of fertilizer, and $4,000,000 was liquid fertilizer, that particular category would be allocated 40% of the total expenses for the fertilizer department. It is unlikely that 40% of expenses from the fertilizer department would be incurred selling liquid fertilizer when, for the most part, WFC never handled the product. Another thing to consider is that factors such as salaries and time allocation were decided by the manager at each location. While the WFC management were accurate with their figures, this is an opportunity to skew the results in a particular direction. If a manager knows that his feed sales are low and does not want to show a decreased profit, he may allocate someone's time to another department rather than to the feed.

By estimating the time a person or piece of equipment spends in a single department, the results are only as accurate as the person doing the estimating. To obtain the most accurate results, the general manager must be aware of the possibility of skewing the data.

The second limitation to allocating costs by manufacturer is the presence of rebates in the chemical and seed categories. WFC commonly receives rebate checks in one lump sum for the entire organization. WFC may receive a check from "Seed Brand CL" that says "Seed Rebate 2010". There is no differentiation on the check as to which crops or varieties are responsible for the check, which means the rebate is then allocated by percentage of sales for that brand by location. Because WFC is one entity, it is issued one check, so there is no way to fairly allocate the rebate to all locations.

Both CAT 1 and CAT 2 have value to management; however only CAT 1 is feasible at this time. Allocating cost to the manufacturer level may pass the point of diminishing return, in that the information obtained may not be worth the extra time it takes to get it. Running the reports, interpreting the information, confirming the data's accuracy, and entering the data into both CAT 1 and CAT 2 required over 2 weeks during the development of the tools. If one person was devoted to doing this full time, it is possible for them to do this quickly, but it may not be feasible to dedicate someone to this task. The majority of the information for CAT 2 must be extracted using multiple reports for each location; however the information for CAT 1 is already visible to the accountants. Using CAT 1 and tracking costs by department, WFC management may be able to forecast future performance expectations by building simulation models. Because CAT 1 is utilized at both the site level, and the consolidated level, it can identify the majority of any costing problems that may arise. Certain factors such as fuel costs, labor costs, benefits costs, higher COGS or lower margins make a huge impact on a business,

and could possibly be managed by using this model. WFC could also use the spreadsheet as a historical trending tool to identify any trends and try to capitalize on them or to fix them in the future.

VI. Conclusion

Allocating costs, be it for a manufacturer or for a retailer like WFC, is an integral part of the business. With competition growing, margins shrinking, and the impact of recent economic downturns, profits need to be maximized. One way to maximize profits is by lowering expenses. WFC management has access to information presented in multiple ways through their accounting software, and using the new cost allocation tool, has a way to assess information by location and category. Allocating costs by manufacturer is not as valuable as expected, due to the difficulty in getting that information. The number of assumptions that must be made and the lack of precise information on rebates and discounts make it difficult, if not imposssible, to determine the effect expenses have on the profitablity of a brand. The information would be valuable; however, the time needed is cost prohibitive at this time, given the current system. Tracking expenses by product category at both the consolodated level and by site allows management to see where adjustments need to be made to ensure that the business is as profitable as possible. Due to strict competition, and very slim margins, reducing costs is a tool to increase margins. Using CAT 1 to track costs by product category at individual locations will help identify ways to make these margins greater by reducing expenses in given areas. The time spent entering numbers into this tool will be beneficial to WFC if the output is used correctly. As WFC becomes familiar with the benefits of this costing tool, it may be able to add additional tools and create a sytem of tools and reports that can be used to manage its expenses to maximize profit and keep WFC a healthy and competitive cooperative.

VII. References

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