Calculating Your Unit Costs of Production and Using the Information for Enterprise Analysis in Decision Making on the Ranch

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INTRODUCTION

Unit Cost of Production (UCOP) and Enterprise Analysis are tools that ranch managers have been encouraged to utilize in making decisions on the ranch to improve profit. Managers who have adopted these tools have found them to be valuable in identifying where opportunities as well as problem areas are in enterprises on the ranch.

HISTORY OF THE DEVELOPMENT OF UNIT COSTS OF PRODUCTION FOR USE IN RANCH MANAGEMENT DECISIONS

The late 1970s and 1980s were challenging times financially for farm and ranch businesses with many of those not surviving and being forced to exit the industry. In an effort to help ranchers to utilize and understand financial records in the management of their operations, the National Cattlemen's Association's Integrated Resource Management (IRM) subcommittee in the early 1990s developed Standardized Performance Analysis (SPA), production and economic measures, in relation to the guidelines of the Farm Financial Standard's Task Force (FFSTF) for agriculture. The goal was to provide standardization in the terminology and performance measures for evaluating ranch and farm financial performance throughout the United States. A number of agricultural economists in Cooperative Extension such as Dr. Jim McGrann Ph.D., Texas A&M and Dr. Harlan Hughes Ph.D., North Dakota State University were foundational in developing both financial and production record keeping methods as well as the development of software that producers could utilize in the analysis of their business.

THE USE OF UNIT COST OF PRODUCTION AND ENTERPRISE ANALYSIS IS IMPORTANT TO LONG TERM RANCH BUSINESS SUCCESS

The old adage "you can't effectively manage what you don't measure" is still true in relation to managing the ranch business. Knowing UCOP is one of the foundational tools for making effective decisions in the management of ranch resources. The first step however in being able to calculate a UCOP is to have production and financial records. These records do not have to be complicated, but they need to be accurate and thorough. They also need to allow for the allocation of expenses to different enterprises within the ranch. Many computerized financial record keeping programs are designed to easily track and allocate expense within enterprises.

WHAT IS UNIT COST OF PRODUCTION AND HOW IS IT CALCULATED?

Unit Cost of Production is simply a ratio of total costs divided by total product produced. In the case of cow-calf production it would be represented by the following:

$$\text{UCOP} = \frac{\text{Cow-calf Production Costs}}{\text{Total Pounds Produced}}$$

The real power of the UCOP ratio is that everything involved in the production of a pound of calf is either represented in the numerator or denominator of the equation. For example, if a producer wants to go out and buy a new pickup that is going to be used in the production of calves, he can estimate how the purchase of that new pickup will affect his UCOP in terms of cost per pound of calf produced. The same thing goes for the purchase of a new bull. Evaluating the purchase of the new bull in light of how many estimated pounds of calf, as well as female value that bull will produce in relation to his cost can give insight into what a producer should be willing to spend.

The Unit Cost of Production ratio can be applied to other enterprises on the ranch as well. If a producer wants to run his calves from weaning over as yearlings, knowing his cost to produce a pound of gain on those calves is important in evaluating the option of selling the calves at weaning or keeping them, growing them and marketing them as yearlings. The same thing applies to the harvest of hay. Knowing all expenses involved in growing and harvesting a ton of hay can give insight into whether or not the haying portion of the ranch business is profitable.

ENTERPRISE ANALYSIS

It can be very challenging to evaluate ways to improve a ranch's profitability without conducting an enterprise analysis. If a ranch's financials basically consist of a yearend financial statement prepared for tax purposes, knowing where to make changes to improve profit can be difficult. Especially if that ranch business is really made up of a number of different enterprises.

For example, let's take a northwest Nebraska ranch that is run on owned land, has a cow-calf operation and runs their calves over as yearlings and also puts up hay. The major product this ranch markets every year is yearling steers. However, this ranch also markets open heifers, heiferettes, bred heifers, cull cows, bred cows and cull bulls. What are the different enterprises on this ranch? Which enterprises in this ranch are profitable and which ones may

be just breaking even or losing money? With only the information found on a yearend financial statement used to prepare a tax return, it is really difficult to know.

For the sake of this example, let's break this ranch into the major enterprises or businesses.

1. Land
2. Cow-calf
3. Stocker/Yearling
4. Heifer Development
5. Hay

Frequently the first enterprise, land, is often overlooked when evaluating the ranch as a whole. This is especially true if the ranch is owned. The land business should be a standalone enterprise on the ranch that the other enterprises, on paper, should pay the equivalent of a fair market value lease rate for. The cow-calf, stocker/yearling, heifer development and hay business all need to pay the land business for the use of the land. All of the costs associated with the land business need to be allocated to that enterprise. Even though this "paying" of the land business only occurs on paper with records utilized within the ranch, it allows the ranch manager to accurately analyze the profitability of and returns to the land business. By treating the five major enterprises on the ranch as individual businesses and having them "pay" a fair market value rate as resources are utilized or moved between enterprises it allows the manager to accurately see where costs as well as revenue are being generated.

One of the challenges producers and others frequently cite when discussing the separating of the ranch into enterprises is the difficulty in knowing how to break out expenses that occur. For example, the tractor that is used to pull the baler to put up hay is also used to feed hay in the cow-calf enterprise as well as the stocker/yearling and heifer development enterprises. How should expenses related to that tractor be allocated? In working with producers I encourage them initially take their best guess as to the amount of time or hours a piece of equipment is used within a respective enterprise and then break out related expenses accordingly. Initially the goal is to get close and provide a reasonable figure that will allow for a reasonably accurate enterprise analysis. In subsequent years, simple records such as writing down the number of hours the tractor has at the start and end of the haying season can be used to refine these numbers.

THE RISK OF COST ALLOCATION

A risk a ranch manager should be aware of when allocating expenses to enterprises is the fact that elimination of an enterprise won't always remove all of the associated costs involved with that business. For example, let's say the manager of our example ranch is tired of

putting up hay and wants to see what the ranch might look like financially if he grazed his meadows and purchased any needed hay. Discontinuing the hay operation will not stop all of the costs that were associated with that enterprise as the tractor used in harvesting hay is also used in the feeding of hay. The taxes, insurance, depreciation, repairs and any interest on money owed on the tractor are now all going to be paid entirely by the other ranch enterprises that use it. Eliminating the haying enterprise, which would reduce the hours the tractor is used, will actually potentially raise the overall tractor expenses related to the cow-calf and stocker/yearling business as they are now responsible for all tractor related expenses. Evaluating the potential ripple effects of a decision made within one enterprise across all other enterprises is an important consideration when making management decisions.

THE USE OF UNIT COST OF PRODUCTION AND ENTERPRISE ANALYSIS ON RANCHES TODAY

In visiting with ranchers, agricultural lenders and agricultural economists, it would appear that the adoption of these tools as an industry within ranching has been relatively slow with only a small percentage of ranch managers actively utilizing UCOP and enterprise analysis or managerial accounting with cost and profit centers in their operations today. What is the reason for such slow adoption of these tools at the ranch level? First, most ranch managers/owners were likely trained in production and enjoy that part of the business best. Along with that is the subconscious perception by many that he who produces the best cattle should be profitable. Thus the production side of the business is what captures a majority of their focus and energy. Second, many find the time involved with the record keeping and data collection needed to calculate unit cost of production and to perform enterprise analysis to be something that easily gets forgotten in the course of daily business operations and thus they fail to have what is needed at year end. Third, many producers find the task of pulling all the data together and getting it into a form that can be understood and then used to make decisions to be overwhelming. Thus the process is frequently viewed as something that is important that “should get done” but remains off in the future to be completed “sometime.”

THE IMPORTANCE OF USE OF UNIT COST OF PRODUCTION FOR RISK MANAGMENT

The volatility in commodity markets today creates both challenges and opportunities for ranch managers as they seek to limit increases in input costs while trying to consistently capture the greatest profit over time from the forage they grow through the cattle they produce. There are a number of different risk management tools and options available to producers today. When a ranch manager knows their unit cost of production, there is greater confidence in utilizing market risk management tools to protect a profit.

WHO CAN HELP ME PERFORM A UCOP AND ENTERPRISE ANALYSIS?

If you have never performed a UCOP analysis on your cow-calf enterprise or broken the ranch into different enterprises, it can initially seem a bit overwhelming. However, like most things in life, the more you work at something usually the easier it gets. In this region, University of Wyoming Extension Educator Dallas Mount and I are willing to work with producers on a one on one basis to help them calculate UCOP numbers for their cow-calf enterprises as well as other enterprises on their ranch. If you are familiar with the use of Excel® spreadsheets, Dallas has developed spreadsheets that are available on the web at http://hpranchpracticum.com/. These spreadsheets use the information and formats developed by Dr. Harlan Hughes and have put them into forms that can be easily used in Excel®. Also at the High Plains Ranch Practicum website are sample ranches that have UCOP numbers calculated for them as well as instructional videos that can help producers walk through the process. Obviously, Dallas and I aren't the only ones who can help you with this process as there are additional Extension personnel and programs available that can assist producers in the process of being able to calculate UCOP for enterprises on their ranch and walk through that analysis. One such excellent resource is North Dakota State University's Cow Herd Appraisal Performance Software (CHAPS) program. More information on the CHAPS program is available at http://www.chaps2000.org/.

THE POWER OF BENCHMARKING

Once a ranch manager has taken the time to learn how to calculate UCOP numbers for their ranch and is confident in the accuracy of those numbers, then it is time to examine where changes might be made to better meet desired management goals. This involves examining both input costs and production numbers and comparing them to some industry standard numbers or benchmarks. Perhaps one of the most valuable parts of enterprise analysis is the ability to benchmark UCOP numbers against other businesses with like enterprises. Being able to accurately compare production values and costs against others gives the opportunity to identify competitive advantages as well as problem areas where adjustments could be made. Successful athletic teams are constantly comparing themselves to the best and looking at the statistics and strategies of other successful programs to see how they might be more competitive. For ranch managers UCOP numbers are the "statistics" that allow them to compare themselves to others and then make adjustments that will enhance their ability to meet their business and personal goals. Seeing the performance numbers of other successful ranches can help a ranch manager identify where there may be opportunities to improve their business. As a manger thinks through possible management changes, utilizing a team approach that includes other people to provide input on the proposed changes such as an extension personnel, veterinarian, economist, animal scientist, range scientist, and other

successful ranchers can be beneficial. Both the High Plains Ranch Practicum web site http://hpranchpracticum.com/ , and the CHAPS website http://www.chaps2000.org/, provide benchmark numbers based on recently conducted UCOP analysis that are valuable for producers to compare their own numbers to.

CAUTIONS WITH BENCHMARKING

There are some things producers should be aware of when utilizing benchmarks and comparing them to their own operation. The first is to make sure you are comparing your production and cost calculation numbers to others who have calculated their numbers in the same way. When a data set has a history and uniform method for calculating numbers this can help insure the benchmark figures are accurate. The second is to try to compare your numbers to ranches with similar resources and in the same region. It can be interesting and valuable to see what those numbers are for other parts of the country, but comparing your numbers to others with a similar set of circumstances is likely going to be the most helpful.

At the end of this paper (Table 1) is a one page sample UCOP calculation for a cow-calf enterprise in Western Nebraska on a per cow basis. If a producer has never analyzed the costs involved with the cow-calf enterprise in their operation, I find that having them compare their own expenses to these numbers can be an eye opening experience.

SUMMARY

Unit Costs of Production is the one ratio that takes into account both product produced and input costs. Knowing UCOP allows a manager to look forward utilizing both present and projected input costs and production numbers to make informed decisions. Ranch managers who know the UCOP numbers for ranch enterprises and understand the interaction between input costs and production are able to implement strategies to help them effectively manage resources to meet both business and personal goals.

Table 1. Neb. Panhandle Est. Costs/Calf Produced. March/April Calve & Wean Nov. 20% of Heifers Retained as Replacements. 2-Yr-Old Heifers Calving Feb. 10.

Mature Cows Feed Costs	Quantity	Price	Cost/Cow
Crop Residue Nov 1 - Feb 28	4 Mths	$15	$60.00
Protein Supplement Jan 1 - Feb 28 alf. hay	200 lbs	$150/T	$15.00
Pasture Mar 1 - May 15 (For Calving/Pairs)	2.5 Mths	$5	$12.50
Alfalfa and Grass/Millet/Sorg. Sudan Hay	1.2 Ton	$120/T	$144.00
Pasture May 15 - Oct 31	5.5 Mths	$28	$154.00
Salt and Mineral for 12 Months	70 lbs	$.20/lb	$14.00
Total			**$399.50**
Two-Yr-Old Heifers Feed Costs 16% of the Herd			
Crop Residue Nov 1 - Feb 1	3 Mths	$15	$45.00
Protein Supplement Dec 15 - Feb 1 (alfalfa	250 lbs	$150/T	$18.75
Pasture Feb 1 - May 15 (For Calving/Pairs)	3.5 Mths	$5	$17.50
Alfalfa and Grass Hay (Millet, Sorghum-	1.7 ton	$120/T	$204.00
Pasture May 15 - Oct 31	5.5 Mths	$28	$154.00
Salt and Mineral for 12 Months	70 lbs	$.20/lb	$14.00
Total			**$453.25**
Replacement Heifers 20% Replacement			
Crop Residue/Alfalfa Aftermath Nov 1 - Feb	3.5 Mths	$10	$35.00
Protein Supplement Dec 15 - Feb 15	300 lbs	$150/T	$22.50
Growing Ration Dry Lot Feb 15 - May 15	3 Mths	$45	$135.00
Pasture May 15 - Oct 31	5.5 Mths	$20	$110.00
Salt and Mineral for 12 Months	45 lbs	$.20/lb	$9.00
Total			**$311.50**
Estimated Annual Bull Feed Costs			**$400.00**
Feed Costs per Cow Unit Includes Bulls, 2-Yr-Olds & Rep. Heifers			**$490.39**
Total Other Cash Costs Vet. Med. Bldngs. Equip. Mrkting. Int. Etc.			**$70.00**
Labor	5 hours/yr	$15.00/hr	**$75.00**
Total Operating Costs			**$635.39**
Ownership Costs			
Int. on Cattle Value (Ave. Val. Over Life)	$1050	4.0%	$42.00
Purchase of bull every 4 years for 25 cows	$4000/100		$40.00
Taxes and Insurance Buildings and Equip.			$10.00
Equipment and Facilities Depreciation			$20.00
Total Ownership Costs			**$112.00**
Total Costs Excluding Cull Credits			**$747.39**
Cull Credits			
Cull cow - death loss (0.16-0.015 = 0.145)	1250 lbs	$0.60	$108.75
Cull heifer - death loss (0.04-0.003 = 0.037)	850 lbs	$1.25	$39.31
Cull bull - death loss (0.01 - 0.0005 =.0095)	1800 lbs	$0.70	$11.97
Total Cull Credits			**$160.03**
Capital Cost of Rep. Heifer Calf at Weaning	20% Rep. Rate	$850	**$170.00**
	Net Capital Cost		**$9.97**
	Net Cost Per Cow		**$757.36**

Cost/calf weaned/cow exposed at 80%=$946.70, 85%=$891.01, 90%=$841.50